S. M. VAUCLAIN & K. RUSHTON.

GEARED LOCOMOTIVE.

APPLICATION FILED MAR. 11, 1915.

1,140,218.

Patented May 18, 1915.

3 SHEETS—SHEET 1.

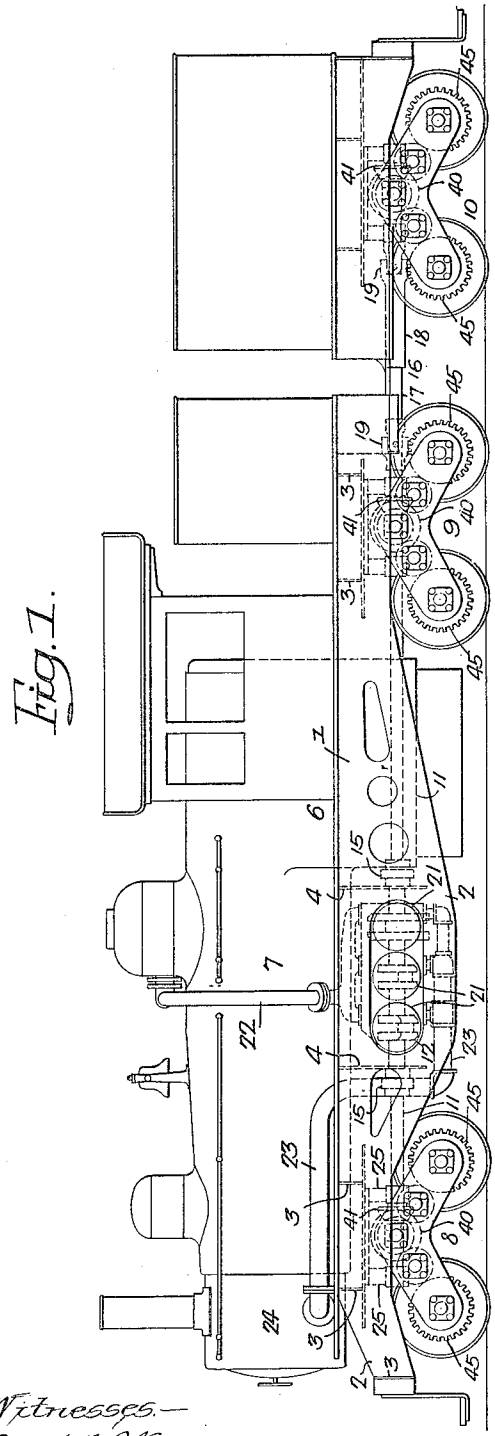

Fig. 1.

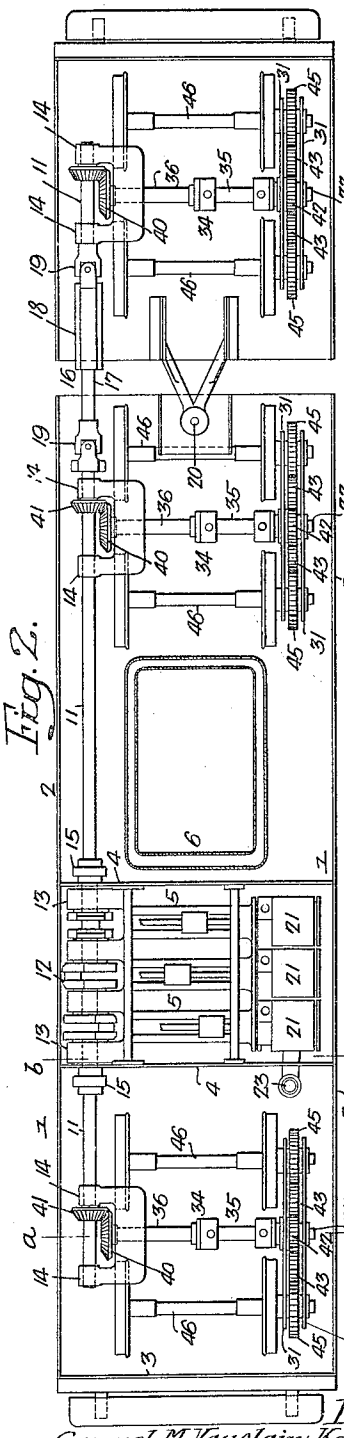

Fig. 2.

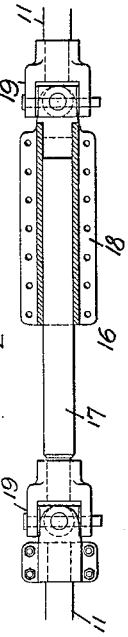

Fig. 7.

Witnesses.—
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Fig. 4.

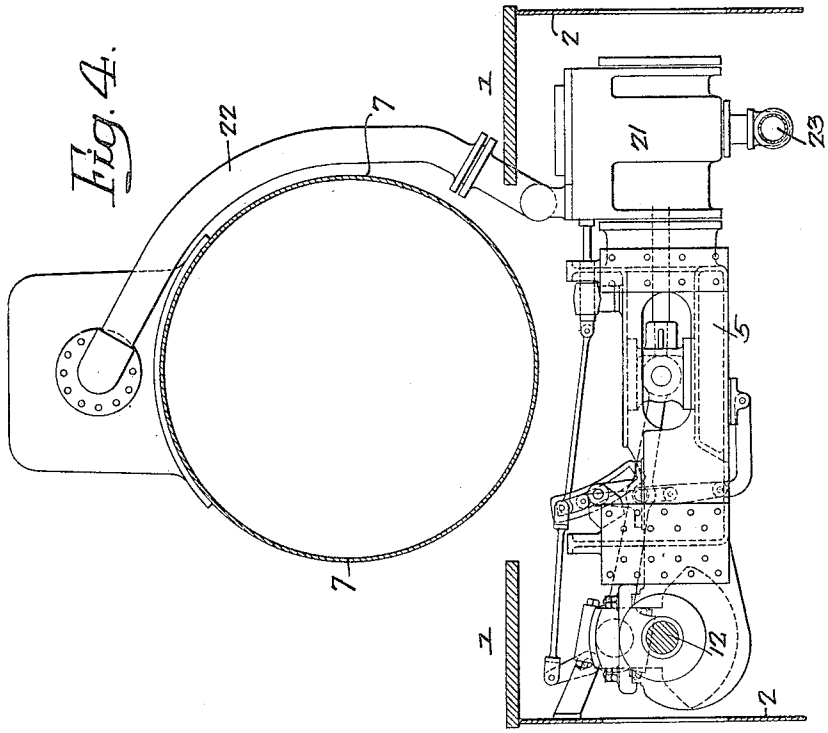
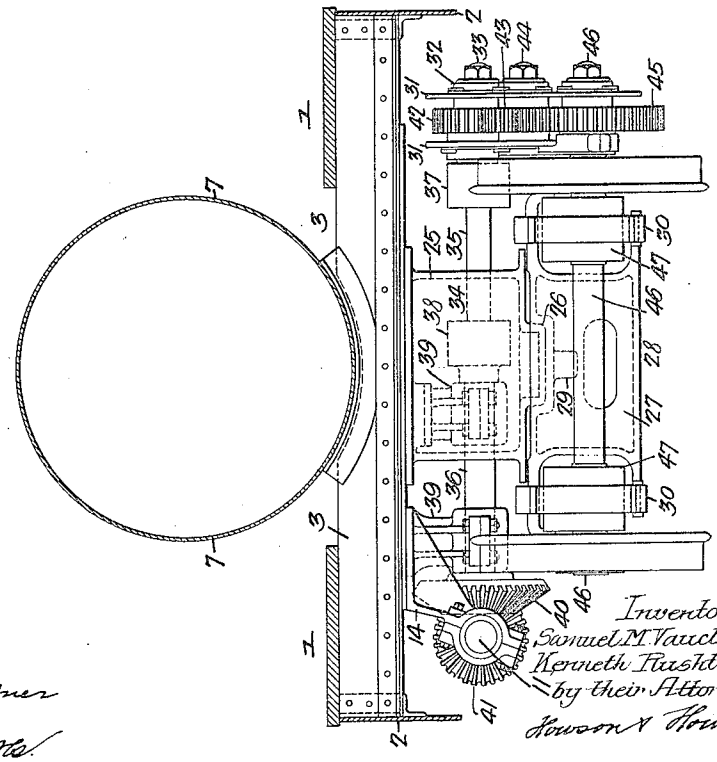


Fig. 3.



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3 SHEETS—SHEET 3.

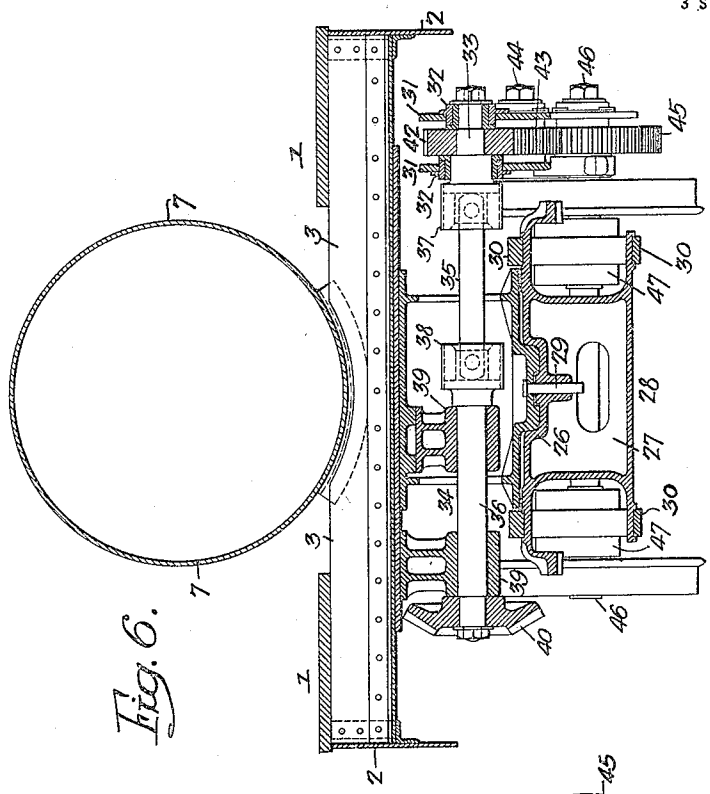

Fig. 6.

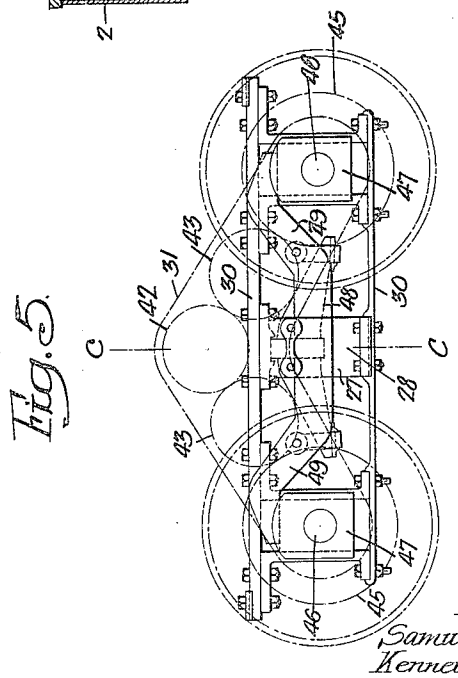

Fig. 5.

Witnesses.—

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UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN AND KENNETH RUSHTON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

GEARED LOCOMOTIVE.

1,140,218. Specification of Letters Patent. Patented May 18, 1915.

Application filed March 11, 1915. Serial No. 13,706.

To all whom it may concern:

Be it known that we, SAMUEL M. VAUCLAIN and KENNETH RUSHTON, citizens of the United States, and residents of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Geared Locomotives, of which the following is a specification.

Our invention relates to certain improvements in geared locomotives, *i. e.*, a locomotive in which the driving wheels are geared to a driven shaft.

One object of our invention is to construct a locomotive of this type so that the driving shaft and the gearing are accessible at the side of the locomotive, and the necessary repairs can be made without dismantling the locomotive.

A further object of the invention is to locate the locomotive driving shaft at one side of the locomotive and to locate the gearing between the driving shaft of each truck and the axles on the opposite side of the locomotive.

A still further object of the invention is to provide means whereby the trucks can swing under the frame without disengaging the gearing.

These objects we attain in the following manner, reference being had to the accompanying drawings, in which:—

Figure 1, is a side view of our improved geared locomotive; Fig. 2, is a sectional plan view showing the trucks and the longitudinal driving shaft and engines; Fig. 3, is a transverse section on the line *a*—*a*, Fig. 2; Fig. 4, is a transverse sectional view on the line *b*—*b*, Fig. 2; Fig. 5, is an enlarged side view of one of the trucks; Fig. 6, is a longitudinal sectional view on the line *c*—*c*, Fig. 5; and Fig. 7, is a sectional view of that portion of the driving shaft between the locomotive and the tender.

Referring to the drawings, 1 is the frame of the locomotive consisting of side plates 2 extending the full length of the locomotive and transverse plates 3 and 4. The transverse plates 4 are spaced apart and the frame 5 of the engine is secured to these plates, as clearly shown in Fig. 2. The engine is arranged transversely and extends the full width of the locomotive, in the present instance, directly in front of the fire box structure 6 of the boiler 7, occupying the space between the front end of the fire box and the ash pit and a truck 8.

9 is the rear truck and 10 is the tender truck.

11 is the longitudinal driving shaft of the engine extending practically the full length thereof and having a crank section 12. This shaft is adapted to bearings 13 on the engine frame 5 and the shaft is also mounted in suitable bearings 14 at the truck. The shaft is made in sections and couplings 15 are used to connect the several sections. The coupling section 16 between the locomotive and the tender consists of two parts, the part 17 sliding in the part 18, and these parts are connected by universal joints 19 to the main portions of the shaft so that, while the engine shaft is driven, the portion of the shaft carried by the tender can accommodate itself to the movement of the tender which is coupled at 20 to the locomotive.

In the present instance there are three cylinders 21 mounted on the engine frame, and these cylinders are located on the opposite side of the locomotive from the driving shaft. The parts which need attention are readily accessible from either side of the locomotive. Steam is supplied to the three cylinders through the steam supply pipe 22, which is coupled to the steam chests of the engine, as clearly illustrated in Fig. 1.

23 is an exhaust pipe for the engine leading to the smoke box 24 at the forward end of the locomotive.

The three trucks 8, 9 and 10 are identical in construction, in the present instance, and depending from the frame of the locomotive is a center bearing structure 25 having a center bearing 26 and fitting the cavity in the cross member 27 of the frame 28 of the truck and connected to the truck by a king bolt 29. The cross member is rigidly attached to the side frame 30 of the truck and springs 48 are also mounted on the truck together with the equalizing bars 49 which rest on the axle boxes thereof in the ordinary manner.

Mounted at one end of the truck is a frame consisting of two plates 31 spaced apart, and this frame is carried by the axles. In the upper portion of the frame is a bearing 32 for the section 33 of the transverse shaft 34 which, in the present instance, is made in three sections 33, 35 and 36. The

section 35 is connected to the section 33 by a universal joint 37 and is connected to the section 36 of the shaft by a universal joint 38. This joint not only allows for the universal movement of the section 33, but also allows a limited amount of longitudinal movement so as to accommodate the turning of the truck on its pivot. The section 36 of the shaft 34 is mounted in bearings 39 secured to the transverse member 3 of the frame of the locomotive and has, at its outer end, a bevel gear wheel 40 which gears with a bevel wheel 41 on the shaft 11. On the section 33 of the shaft 34 is a gear wheel 42 which meshes with intermediate gear wheels 43 on studs 44 mounted in the plates 31, and these intermediate gear wheels mesh, in turn, with gear wheels 45 secured to the axles 46 of the truck. These axles are mounted in suitable boxes 47 and have a certain amount of vertical movement in the frame of the truck. By making the shaft 34 in sections connected together by universal joints, this movement can be accommodated without disturbing the relation of the gearing on the truck or the gearing on the main frame of the locomotive. Thus it will be seen that each of the axles of the several trucks is positively driven from the main longitudinal driving shafts and, owing to the special construction, each truck is free to turn on its pivot and the trucks can be spring supported on the axles.

The engine frame is so designed that the engine can be assembled complete and mounted in its proper position. The location of this engine is directly in front of the fire box and the construction of the locomotive allows sufficient room so that access can be had to all portions of the engine.

The side plates 2 are so designed that they inclose the working parts of the engine and also act as a shield for the upper portions of the gearing of the truck. This gearing may be provided with guards of any suitable type so as to prevent accident due to carelessness when working around the locomotive.

In some instances, instead of gearing, drive chains may be used for connecting the truck driving shaft with the axles, without departing from the essential features of the invention.

We claim:—

1. The combination in a geared locomotive, of a frame; a boiler mounted thereon and having a fire box; a truck located in advance of the fire box structure and a truck located at the rear thereof; an engine transversely arranged and located between the fire box and the forward truck; a longitudinal driving shaft at one side of the locomotive having a crank section to which the connecting rods of the engine are attached; a driven shaft for each truck geared to the driving shaft; and axles on the truck; with means for positively driving the axles from the said driven shaft.

2. The combination in a geared locomotive, of a frame; a boiler mounted thereon and having a fire box; a truck located in advance of the fire box structure and at the rear thereof; an engine transversely arranged and located between the fire box and the forward truck; a longitudinal driving shaft at one side of the locomotive having a crank section to which the connecting rods of the engine are attached; a driven shaft for each truck geared to the longitudinal driving shaft; axles on the truck driven positively from the said driven shaft; a tender at the rear of the locomotive, the said driving shaft being continued to the tender and mounted in bearings thereon; a flexible joint connecting the extension with the main portion of the shaft; a transverse driven shaft for the truck of the tender; axles on the said truck; and means for positively driving the axles from the said driven shaft.

3. The combination in a geared locomotive, of a frame; a longitudinal driving shaft at one side of the frame; an engine for driving said frame; a truck having axles thereon and pivotally mounted under the frame; a transverse shaft carried partly by the frame and partly by the truck; a universal coupling in the shaft; and means for driving the axles from the said transverse shaft.

4. The combination in a locomotive, of a frame; a longitudinal driving shaft mounted thereon; an engine carried by the frame for driving the shaft; a truck pivotally mounted under the frame; a truck frame mounted under the main frame; axles; means for yieldingly supporting the truck frame on the axles; a frame at one side of the truck frame and carried by the axles; a transverse shaft carried partly by said latter frame and the main frame of the locomotive and having a universal joint; and means located on the side of the locomotive opposite to the longitudinal driving shaft for positively driving the axles from the transverse shaft.

5. The combination in a locomotive, of a frame; a longitudinal driving shaft at one side of the main frame; means for driving said shaft; a truck frame pivotally mounted under the main frame; axles mounted on the truck frame; a transverse driving shaft made in two sections; a universal joint coupling the two sections; bearings on the main frame of the locomotive for one of said sections, the other section having its bearings carried by the truck; and means for positively driving the axles from the said transverse shaft.

6. The combination in a geared locomotive, of a main frame; a longitudinal driv-

ing shaft at one side of the locomotive; means for driving said shaft; a truck frame pivotally mounted under the locomotive; axles mounted in the truck frame; means for yieldingly supporting the frame on the axles; a transverse shaft partly carried by the main frame and partly by the truck and having a universal joint to allow one section to yield independently of the other; gearing connecting one end of the transverse shaft with the longitudinal shaft; and a train of gears connecting the section of the transverse shaft carried by the truck with the axles so that the axles are positively driven from the main driving shaft.

7. The combination in a locomotive, of a main frame; a boiler mounted thereon having a fire box; two trucks pivotally mounted under the frame of the locomotive, one in advance of the fire box and the other at the rear thereof; an engine transversely arranged and located between the fire box and the front truck; a longitudinal driving shaft at one side of the locomotive and having a crank section to which the rods of the engine are connected; two axles on each truck; means for yieldingly supporting the truck frames on the axles; a frame at the side of each truck opposite to the longitudinal driving shaft; a transverse shaft made in two sections; a universal joint connecting the two sections, one section being mounted on the frame carried by the axles of the truck, the other section being mounted in bearings in the main frame of the locomotive; gearings through which the said transverse shaft is driven from the main longitudinal driving shaft; and gearing by which the axles are driven from the said transverse shaft, said gearing being mounted on the side of the locomotive opposite to the longitudinal shaft.

8. The combination in a geared locomotive, of a frame consisting of deep side plates extending from end to end of the locomotive and connected together by two sets of transverse plates; a boiler mounted on the frame and having a fire box section; a truck supporting the frame and located under each side thereof, one set of transverse plates being located directly in advance of the fire box of the boiler; a transversely arranged engine frame located between said two transverse plates and secured rigidly thereto and having bearings at one end for the longitudinal cranked driving shaft and having overhung cylinders at the opposite end, the entire mechanism being within the space between the two side frames of the locomotive; axles supporting the trucks; and means for positively driving the axles from the said cranked driving shaft.

9. The combination in a geared locomotive, of a frame consisting of deep side plates and transverse plates secured to the side plates; a boiler having a fire box; two of said transverse plates being spaced apart and located under the boiler in front of the fire box structure; a transversely arranged engine secured to the transverse plates and having bearings at one side and overhanging cylinders at the opposite side, the entire engine structure being located in the space between the side plates of the main frame; bearings on the main frame at one side of the locomotive in line with the bearings on the engine frame; a longitudinal driving shaft mounted within the bearings and having a crank section mounted in the bearings of the engine frame; the rods of the engine being connected to the cranks; center bearings secured to the under side of the main frame at each end thereof; a truck having a frame pivotally mounted under each center bearing; axles mounted on the truck; means for yieldingly supporting the truck frame on the axles; a frame consisting of two plates spaced apart carried by the axles and located on the truck on the side opposite to the longitudinal driving shaft of the locomotive; a transverse shaft at each truck; bearings made in two sections connected together by a universal joint, one of said sections being mounted in bearings hung from the main frame of the locomotive, the other section being mounted on the frame consisting of two plates carried by the axles of the truck; gearing between one end section of the transverse shaft and the longitudinal driving shaft; a gear wheel on the other section of the transverse shaft; a gear wheel on each axle; and intermediate gears carried by the frame so that, while each truck is free to turn on its pivot, the axles are positively driven from the main driving shaft of the locomotive.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

SAMUEL M. VAUCLAIN.
KENNETH RUSHTON.

Witnesses:
IRVIN M. PFEIFFER,
CHARLES E. ROBINSON.