O. McG. COX.

TRACTION ENGINE.

APPLICATION FILED MAY 27, 1910.

1,028,190.

Patented June 4, 1912.

3 SHEETS—SHEET 1.

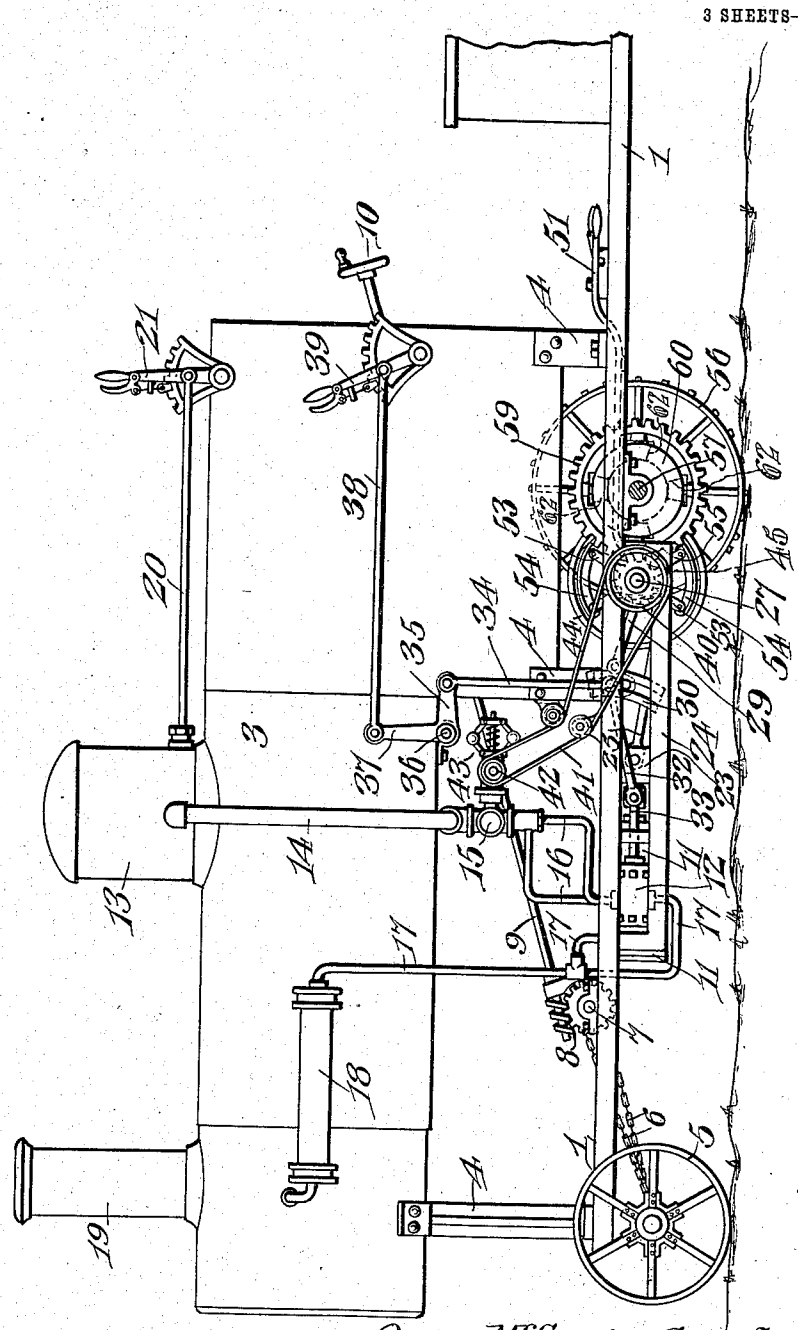

Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

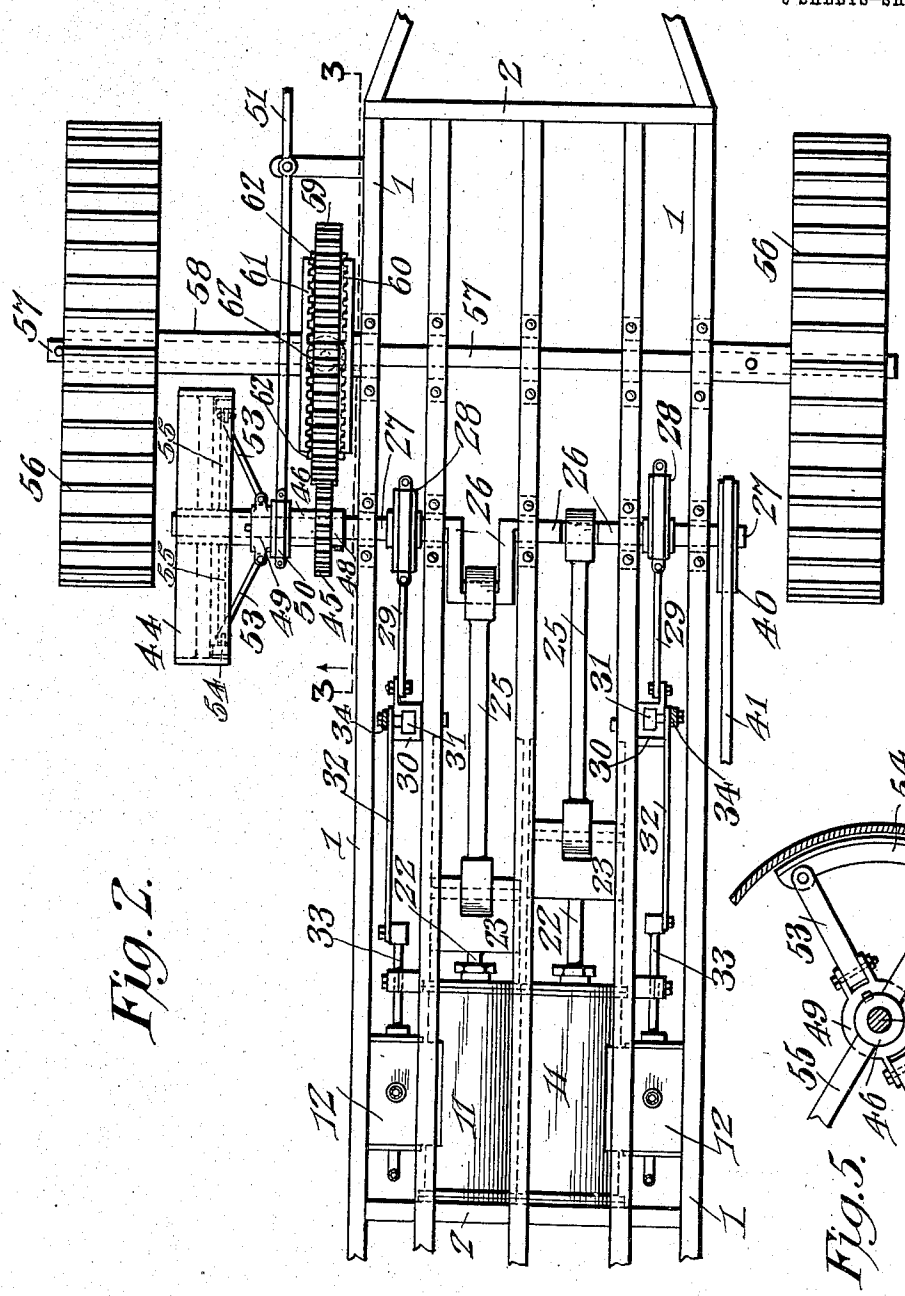

Fig. 2.

Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 3.

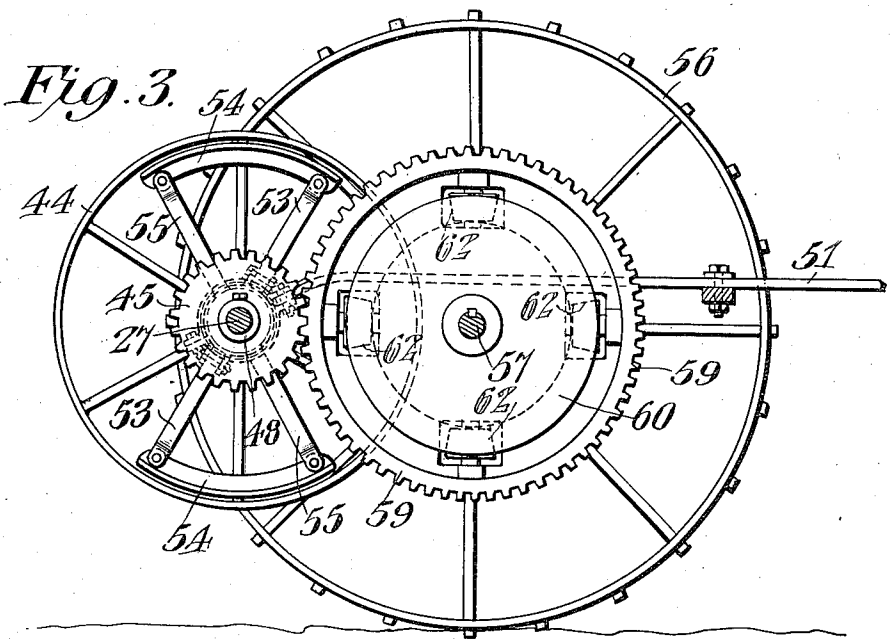
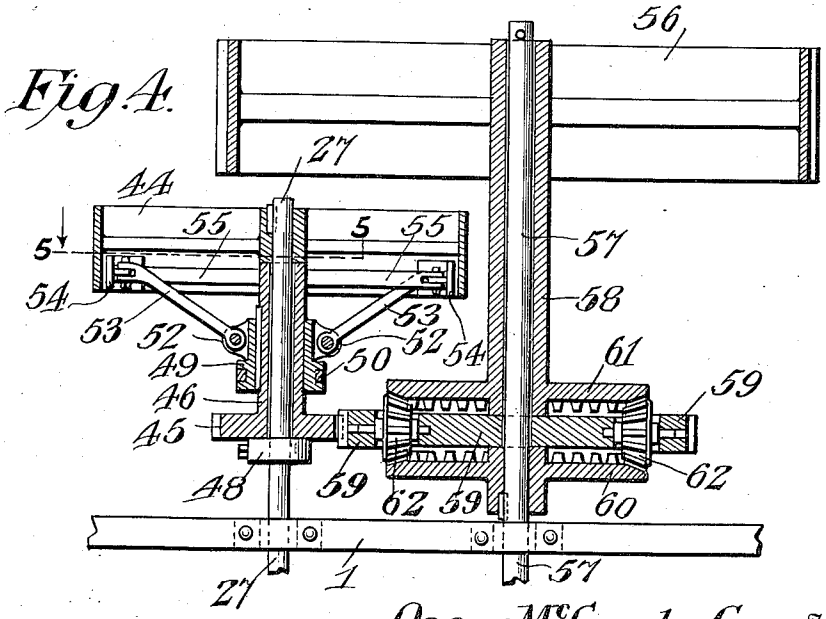


Fig. 4.



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TRACTION-ENGINE.

1,028,190. Specification of Letters Patent. Patented June 4, 1912.

Application filed May 27, 1910. Serial No. 563,813.

To all whom it may concern:

Be it known that I, OSCAR MCGRUDER COX, citizen of the United States, residing at Plainview, in the county of Hale and State of Texas, have invented a new and useful Traction-Engine, of which the following is a specification.

This invention relates to improvements in traction engines and has for its object the provision of a mechanism by which the power exerted in the working cylinders may be applied directly to the driving shaft without causing any bending strain upon the axle of the traction wheels and which will permit the power to be withheld from the axle and utilized for performing work at a point distant from the engine without necessitating any excessive readjustment of the parts.

A further object of the invention is to so arrange the driving mechanism as to economize space and reduce the dead weight which traction engines have been forced to carry.

These objects, and such other incidental objects as will hereinafter appear, are attained in the use of the mechanism illustrated in the accompanying drawings, and the invention consists in certain novel features of the same which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the drawings,—Figure 1 is a side elevation of a traction engine embodying my present invention. Fig. 2 is a plan view of the frame and the operating mechanism, the boiler being removed. Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2. Fig. 4 is a detail section taken longitudinally of the axle and the driving shaft. Fig. 5 is a detail section on the line 5—5 of Fig. 4.

In carrying out my present invention, I employ a main frame comprising a series of longitudinal beams 1 connected at suitable points by transverse beams 2, as will be readily understood. The boiler 3 is supported upon the main frame by standards 4 and may be of any suitable construction, while at the front end of the main frame is provided the steering wheels 5 operated by an ordinary form of steering gear comprising chains or cables 6 connected to the front axle and operated from a windlass 7 manipulated by worm gearing 8 and a steering rod 9 extending rearwardly to the cab or engineer's platform and equipped with a hand wheel 10.

Between the inner-most longitudinal beams I provide a pair of working cylinders 11 which are placed close together and at opposite sides of the longitudinal medial line of the frame. A steam chest 12 is provided on the outer side of each cylinder, and this steam chest is connected with the steam dome 13 on the boiler by a feed pipe 14 which leads from the steam dome to a point beneath the boiler where it is equipped with a governor valve 15 below which branched pipes 16 extend to the steam chests. Exhaust pipes 17 lead from the steam chests through a feed water heater 18 on the side of the boiler and discharge directly below the smoke stack 19 so as to maintain the draft through the fire box, as will be readily understood. The throttle valve is arranged within the steam dome 13 and is controlled by a throttle rod 20 operated by a suitable hand lever 21, as will be readily understood.

The piston within each of the cylinders 11 has its piston rod 22 extending rearwardly from the cylinder and disposed between the inner beams 1 of the main frame and connected to a cross head 23 which slides in guides or ways presented by the said beams, and supplemental frames 24 secured to the under sides of the same and aiding in the support of the working cylinders and the steam chest, as will be readily understood on reference to Fig. 1. From the cross heads 23, pitmen 25 extend rearwardly to the cranks 26 of a driving shaft 27 which is mounted in suitable bearings on the longitudinal beams 1 and supplemental frame 24, the cranks 26 being, of course, disposed at different angles in order to avoid the possibility of the driving shaft coming to rest on a dead center. Between the outermost longitudinal beams 1 and the beams parallel therewith and adjacent thereto, I secure eccentrics 28 on the driving shaft, and these eccentrics are connected by eccentric rods 29 with grooved plates or links 30 which are pivoted between their ends to the frame and have slides 31 mounted within their grooves. These slides 31 are connected by pitmen 32 with the valve stems 33 extending from the steam chests whereby the rotation of the driving shaft will rotate the eccentrics and, consequently, vibrate the links or plates 30, which in turn,

will reciprocate the valve stems and, consequently, control the admission of steam to the working cylinders in the usual manner. In order that the engines may be reversed when desired, links 34 are pivoted to the slides 31 and extend upward therefrom, the upper ends of the said links being pivoted to crank arms 35 on a rock shaft 36 which is journaled in suitable bearings on the under side of the boiler. A crank arm 37 is provided at one end of the rock shaft 36, and this crank arm is connected by a link 38 with a controlling lever 39 at the rear end of the boiler within convenient reach of the engineer. On one end of the driving shaft 27, I provide a pulley 40 which is connected by a belt 41 with a pulley 42 geared to a speed governor 43 by which the governor valve 15 is operated, as will be readily understood.

To the end of the driving shaft 27 opposite the pulley 40, I secure a fly wheel 44, and adjacent this fly wheel I loosely mount upon the driving shaft a pinion 45 having an elongated hub 46 extending to the hub of the fly wheel, as shown clearly in Fig. 4, the said elongated hub or sleeve being held against movement longitudinally of the driving shaft by the said hub of the fly wheel and a collar 48 which is secured to the driving shaft in position to bear against the side of the pinion 45, as clearly shown in Fig. 4. Slidably mounted on the hub or sleeve 46 and keyed to the same is a collar 49 engaged by a yoke or fork 50 at the front end of an adjusting lever 51 which is mounted on the main frame and in a position to be easily reached and operated by the engineer. The collar 49 is provided at its outer end with diametrically opposite lugs 52 to which are pivoted the inner ends of links or levers 53 having their outer ends pivoted to the ends of shoes 54 arranged adjacent the inner side of the rim of the fly wheel, as shown in Figs. 3 and 4. The ends of the said shoes, opposite the ends attached to the links 53, are pivoted to the outer ends of spokes or standards 55 which are rigid with the outer end of the hub or sleeve 46, as shown most clearly in Fig. 5. Power being applied to the driving shaft 27 from the working cylinders 11, the said shaft will be rotated and the fly wheel 44 will, of course, also rotate, inasmuch as it is secured to the end of the said shaft. The rotation of the shaft may thus be transmitted directly to any apparatus which it is desired to operate. The rotation of the shaft will not impart motion to the pinion 45, inasmuch as the hub or sleeve 46 carrying the said pinion is loose on the driving shaft and the shoes 54 are out of contact with the fly wheel so that the fly wheel will not engage the said shoes and set the same in motion. Should it be desired to cause the engine to travel, the operating lever 51 is vibrated so as to move the collar 49 outward upon the sleeve or hub 46, and this movement of the collar will swing the links 53 outward so that the ends of the shoes 54 attached to the said links will be forced against the inner periphery of the fly wheel and will then, of course, rotate with the fly wheel. Inasmuch as these shoes are secured to the arms or spokes 55 which are rigid with the end of the hub or sleeve 46, motion will be imparted to the pinion 45 which will, in turn, be transmitted to the axle of the traction wheels so as to rotate the said traction wheels and cause travel of the engine.

The traction wheels 56 are mounted at opposite ends of the axle 57 which is journaled in suitable bearings on the main frame. One of the traction wheels is fixed to the axle, while the other traction wheel is loosely mounted thereon and carried by a sleeve 58 encircling the axle, as shown most clearly in Fig. 4.

The pinion 45 meshes with a master gear 59 which is carried by the axle between a gear wheel 60 secured to the axle and a similar gear wheel 61 at the inner end of the sleeve 58. A plurality of beveled pinions 62 is carried by the master gear 59, and these beveled pinions mesh with the gear wheels 60 and 61, as shown clearly in Fig. 4. The motion of the pinion 45 will be transmitted directly to the master gear wheel 59 and the rotation of the said gear wheel will cause similar movement in the gear wheels 60 and 61 so that the traction wheels will be rotated. When the machine is being steered out of a straight line so as to turn a corner, the traction wheels will be automatically permitted to travel at different rates of speed to accommodate the different curves described by their respective paths, inasmuch as the beveled pinions 62 will be permitted to rotate about their own axes to permit a differential movement of the gears 60 and 61.

It will thus be seen that I have provided an arrangement by which the axle of the traction wheels is kept free of all bending or breaking strain and in which the power generated in the working cylinders will be directly applied to the driving shaft. The cylinders and steam chests, together with their respective valve gear, are arranged within the main frame below the boiler so that the machine may be built with a narrow gage without in any way detracting from its usefulness. Furthermore, this arrangement of the driving elements brings it into a very compact form so that space is economized and the several parts are protected against injury due to contact with any objects encountered by the engine in its travel from field to field. It will be also noted that when it is desired to arrest the travel of the

machine or to cause the same to travel, the only work to be done is to operate the lever 51 so as to throw the shoes 54 out of or into frictional engagement with the rim of the fly wheel.

The advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto. For instance, I do not wish to be limited to the specific construction of differential gearing herein described and shown in the drawing.

The specific construction of differential gearing shown is of an old type, and is not specifically claimed.

Having thus described my invention, what I claim is:—

1. The combination of a main frame consisting of a series of parallel longitudinal beams and transverse beams connecting the same, a boiler, a pair of working cylinders secured on the said frame between the innermost beams below the boiler, a crank shaft mounted transversely on the frame and having its cranks connected directly with the said cylinders, steam chests on the outer sides of the cylinders and between the outermost beams of the frame, connections between the valves of the steam chests and the crank shaft whereby the admission of steam to the cylinders will be controlled, an axle mounted on the main frame adjacent to and parallel with the crank shaft, a traction wheel fixed on one end of the axle, a traction wheel loosely mounted on the opposite end of the axle, gearing for rotating both of the said traction wheels from the crank shaft, a fly wheel secured on the crank shaft and controlling the said gearing, and means for connecting the said gearing with the fly wheel or disconnecting it therefrom.

2. The combination of a frame, an axle thereon, traction wheels mounted on the said axle, one of the traction wheels being fixed to the axle and the other loose thereon, a differential gearing mounted on the axle and arranged to communicate motion to the traction wheels, a boiler, a pair of steam cylinders with steam chests mounted on the frame below the boiler, a driving shaft mounted transversely in the frame below the boiler and provided with a pair of cranks, direct, gearless and separate connections between the pistons of the cylinders and the cranks of the driving shaft, separate direct connections between the valves of the steam chests and the said driving shaft, said driving shaft being extended and provided with a rigidly mounted band wheel, a single pinion loosely mounted on the driving shaft and in direct mesh with the differential gear, and means for connecting and disconnecting the band wheel with the pinion.

3. The combination of a frame, an axle thereon, traction wheels mounted on the said axle, one of the traction wheels being fixed to the axle and the other loose thereon, a differential gearing mounted on the axle and arranged to communicate motion to the traction wheels, a boiler, a pair of steam cylinders with steam chests mounted on the frame below the boiler, a driving shaft mounted transversely in the frame in advance of the axle below the boiler and provided with a pair of cranks, direct, gearless and separate connections between the pistons of the cylinders and the cranks of the driving shaft, separate direct connections between the valves of the steam chests and the said driving shaft, and a single pinion mounted on the driving shaft for transmitting motion from the driving shaft to the said differential gearing on the axle and through the last mentioned gearing to the traction wheels, said pinion on the driving shaft being disconnected at will from positive connection with said shaft.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

OSCAR McGRUDER COX.

Witnesses:
CHARLES CLEMENTS,
J. A. HUTCHISON.