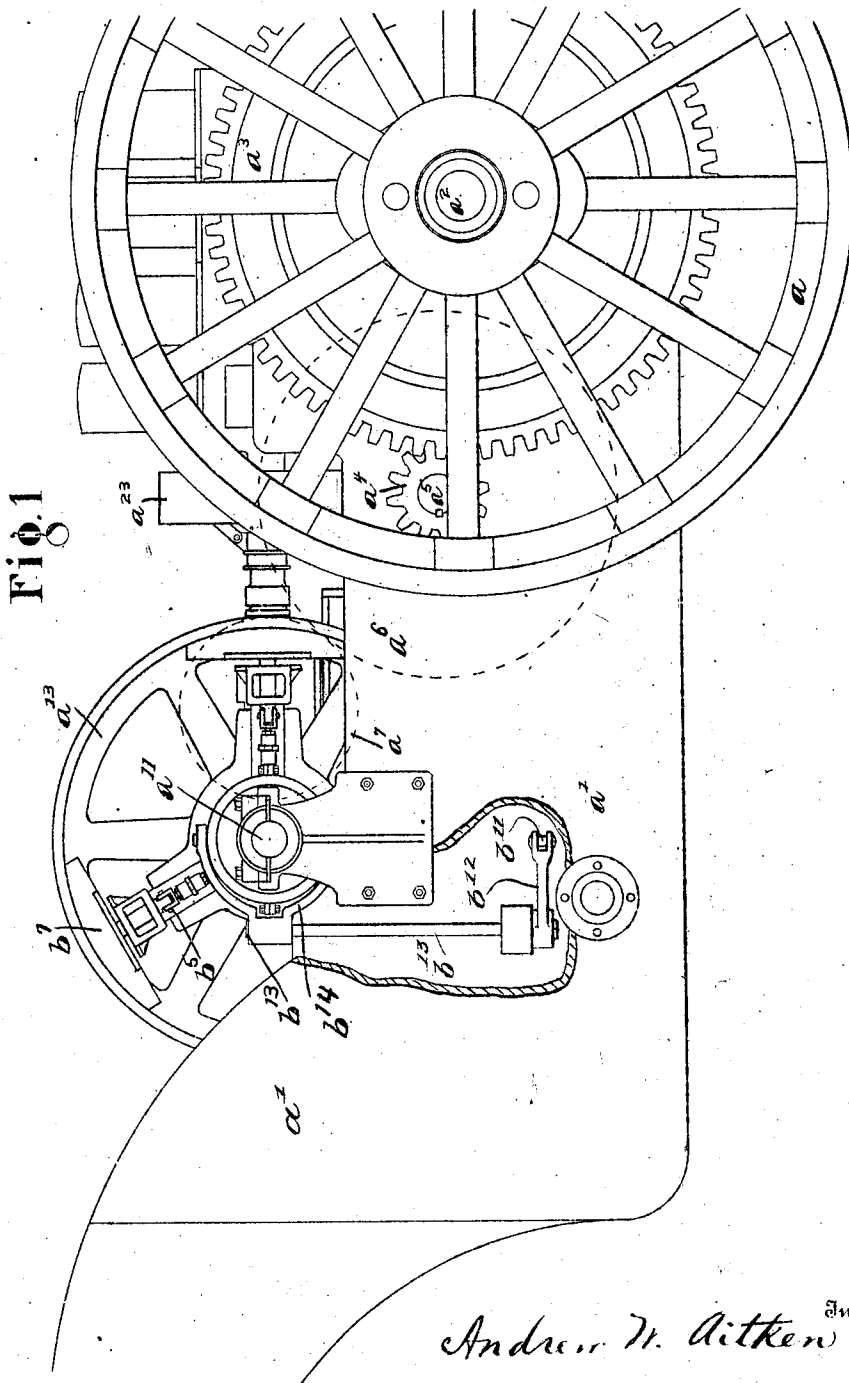


A. W. AITKEN.
GEARING FOR TRACTION ENGINES.
APPLICATION FILED JAN. 20, 1908.

933,945.

Patented Sept. 14, 1909.

3 SHEETS—SHEET 1.



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Witnesses

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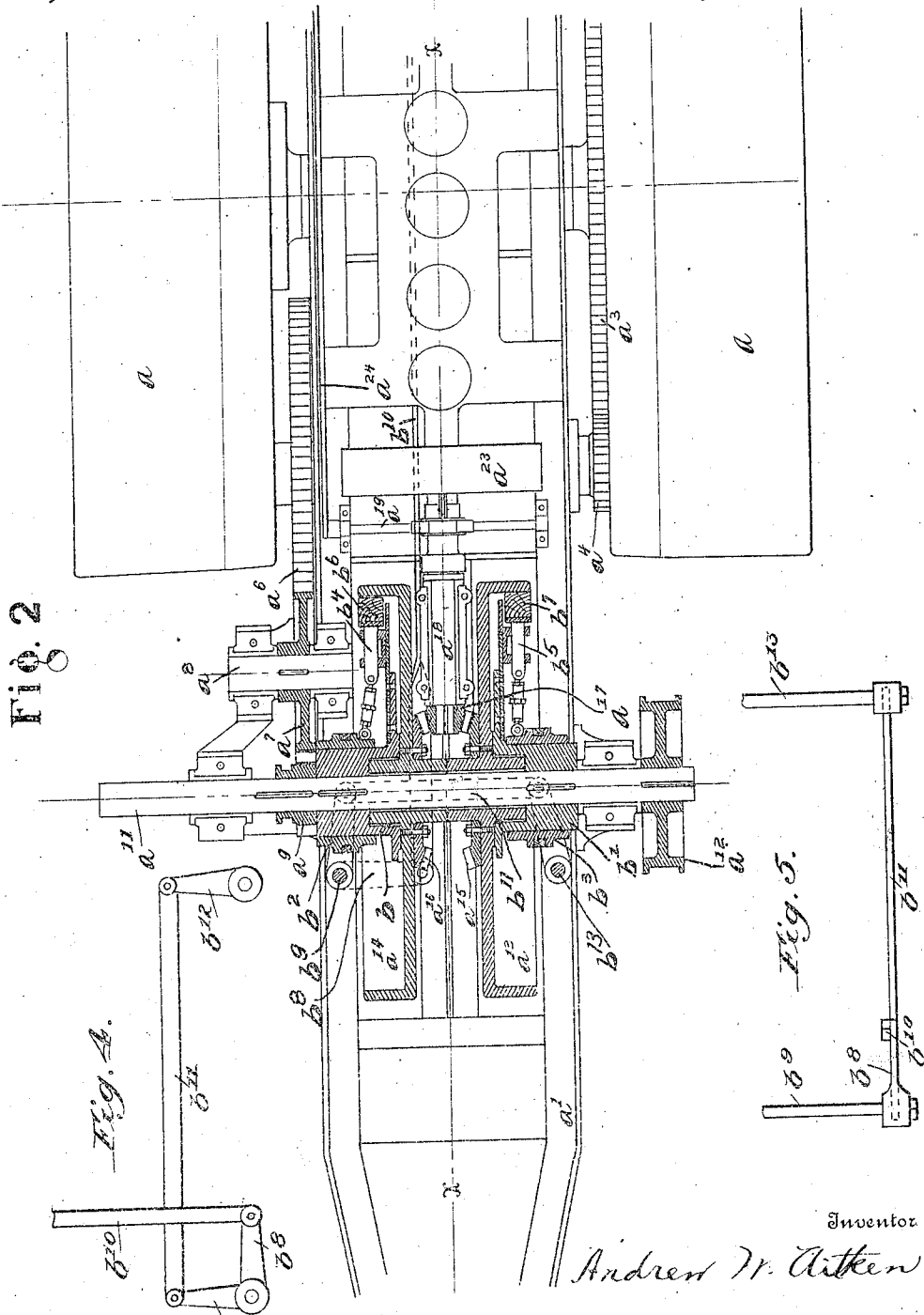


Fig. 2

Fig. 4.

Fig. 5.

Witnesses

G. A. Endter.

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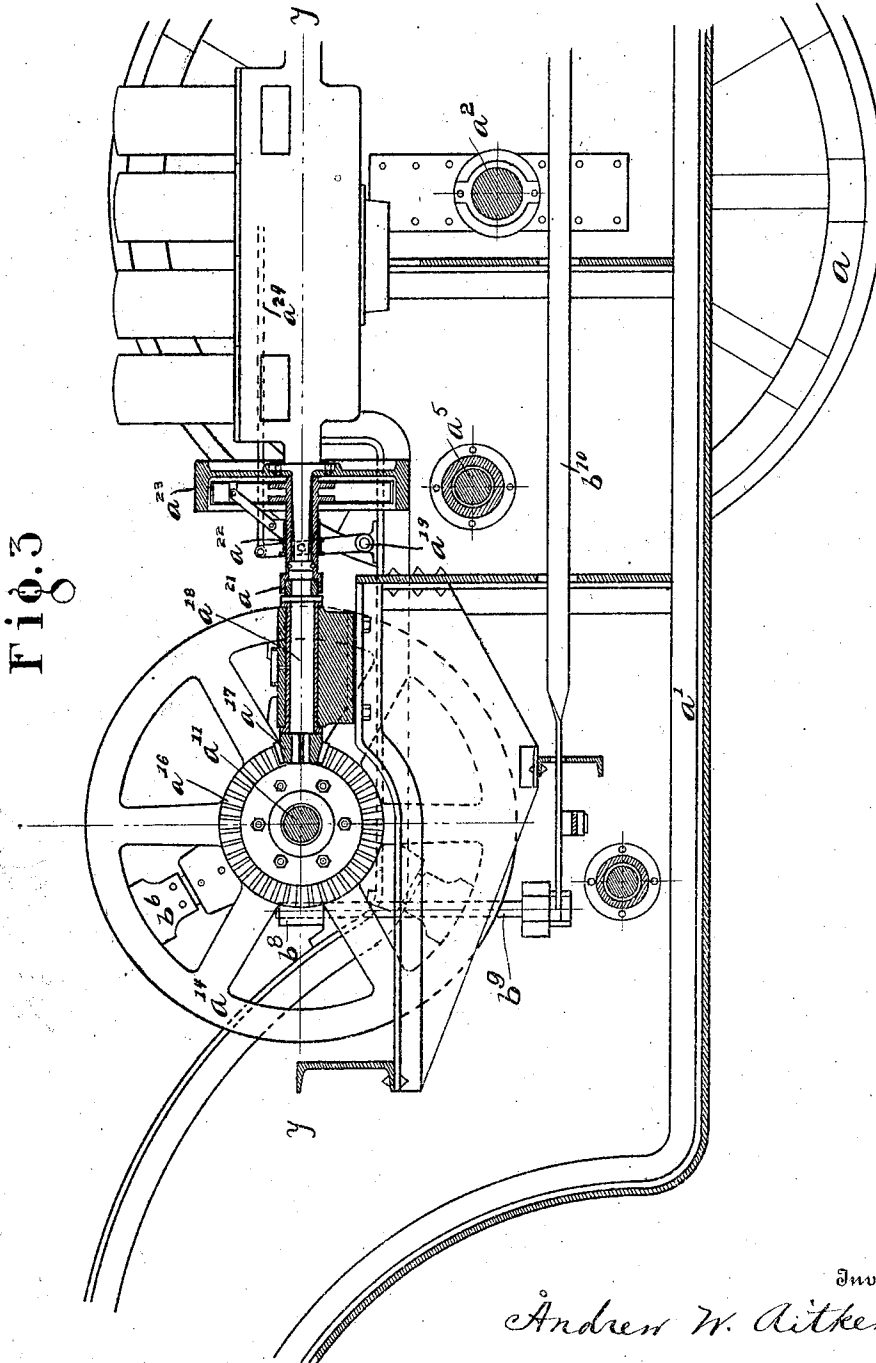
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UNITED STATES PATENT OFFICE.

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GEARING FOR TRACTION-ENGINES.

933,945.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed January 20, 1908. Serial No. 411,870.

To all whom it may concern:

Be it known that I, ANDREW W. AITKEN, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Gearing for Traction-Engines, of which the following is a specification.

My invention relates to improvements in road rollers, traction engines or similar machines driven by gas engine driving appliances.

I have preferably shown a road roller with a four-cylinder gas engine for the driving engine, though my improvement is not limited to that particular type of machine.

In a general way my improvement relates to the connections between the driving engine and the train of gear mechanism for the traction wheels of the road roller, and one of my objects is to construct the parts so the machine may be readily reversed without employing a multiplicity of parts, while my improved machine will operate in an improved manner as hereinafter fully explained.

In the drawings Figure 1 is a side view in elevation showing the frame of the machine and parts necessary to illustrate my improvement. Fig. 2 is a central longitudinal sectional view on the line *yy* of Fig. 3. Fig. 3 is a vertical sectional view taken on the line *xx* of Fig. 2.

Like letters of reference represent like parts throughout the different views.

The driven or traction wheels *a* represent the ordinary wheels of a road roller.

*a*¹ is the frame of the machine and the shaft *a*² for the wheels *a* is supported by said frame in the usual manner. I have shown an ordinary gear *a*³ (Figs. 1 and 2) rigidly secured to the shaft *a*², which is connected to the traction wheel *a* and this gear is shown in mesh with the pinion *a*⁴ which pinion is rigidly secured to a shaft *a*⁵ journaled loosely in the frame *a*¹ and at the opposite end of the shaft *a*⁵ is rigidly secured an intermediate gear *a*⁶ which is shown in mesh with the pinion *a*⁷ (see Fig. 2). The pinion *a*⁷ is keyed to a stub shaft *a*⁸ journaled loosely in the frame of the machine in any ordinary or usual way. It is apparent that this train of gears remains connected so that motion is transmitted from the pinion *a*⁷ to the traction or driven wheels *a*.

The pinion *a*⁷ meshes with the small gear *a*⁹ which is keyed to the transverse shaft *a*¹¹ which shaft is journaled loosely in the frame work of the machine and carries at its opposite end a brake wheel *a*¹². The gear *a*⁹ is shown keyed to the shaft for the purpose of disconnecting the traction wheels and train of gear mechanism from the small driving gear *a*⁹, as it is often desirable to transform the machine into a stationary power operating engine.

Referring now to the connections between the driving engine and the small driving gear *a*⁹, I have shown (Fig. 2) loosely journaled on the shaft *a*¹¹ two large fly wheels *a*¹³ and *a*¹⁴. To the fly wheel *a*¹³ there is rigidly secured a beveled gear wheel *a*¹⁵ and to the fly wheel *a*¹⁴ is secured a gear wheel *a*¹⁶. These beveled gear wheels are shown continuously in mesh with the beveled gear *a*¹⁷ and the three gears constitute intermediate gearing through which power may be applied to both fly wheels equally. The gear *a*¹⁷ is rigidly secured to the longitudinal shaft *a*¹⁸ (see Fig. 3). I have shown preferably an ordinary jointed connection between the longitudinal shaft *a*¹⁸ and the sleeve *a*²¹, and an ordinary clutch connection for operatively connecting the driving shaft of the gas engine with the longitudinal shaft *a*¹⁸. This comprises an ordinary sliding collar mounted upon the sleeve *a*²¹, and consequently when the collar *a*²² of the friction clutch is moved to the right (looking at Fig. 3) the sleeve *a*²¹ will be driven by the fly wheel *a*²³ which in turn will transmit motion to the longitudinal shaft *a*¹⁸. Though I have already shown two large fly wheels on the transverse shaft *a*¹¹, I find it desirable to employ the ordinary gas engine fly wheel *a*²³ and the clutch connection therewith, so that I can operate the gas engine independent of its driving connections until it acquires the desired speed, and then by operating a hand lever (not shown) at the rear of the machine, which hand lever connects with the rod *a*²⁴ which in turn connects with the rock shaft *a*¹⁹ connected to the collar *a*²² the clutch mechanism will be operated so that the fly wheel *a*²³ will drive the longitudinal shaft *a*¹⁸ which in turn will drive the intermediate gear mechanism *a*¹⁵, *a*¹⁶ and *a*¹⁷, and thereby rotate continuously the large driving wheels *a*¹³ and *a*¹⁴. From this description it will be apparent that the

gear a^{17} may rotate continuously by reason of its connections with the driving shaft of the gas engine and as hereinafter more fully explained I utilize one of the large fly wheels for a driving connection with the small driving gear a^9 and while this particular fly wheel is operatively connected with said gear, the driving engine drives the road-roller in one direction and the other opposing fly wheel will continue to rotate, but in a direction reverse to that of its companion fly wheel thereby affording very desirable means for assisting the road roller to overcome difficulties which are necessarily met in the operation of a machine over ordinary roads. This mechanism is especially designed to afford simple and compact connections for driving the machine forward and for reversing the movement, while at the same time the improved form of connecting devices insures the machine being operated in an improved manner over obstructions that are apt to be met with in the operation of the machine.

The connections between the gear a^9 and shaft a^{11} with the fly wheels a^{13} and a^{14} are of the following character: Two clutch spiders, b and b^1 , are rigidly secured to said shaft, a^{11} , one at the side of each fly-wheel, a^{13} and a^{14} . There is mounted on said spiders well known forms of sliding collars b^2 and b^3 which with their corresponding rods b^4 and b^5 form toggle systems. When the collars are moved in a direction away from the fly wheels the toggle becomes shortened and the shoes b^6 and b^7 are drawn inward and the shoes are thereby disconnected from frictional engagement with the internal rim of the fly wheel. I have, however, so arranged the parts that when one collar is slid away from its corresponding fly wheel the other collar will simultaneously be moved toward its fly-wheel and thereby when one fly wheel is disconnected from the shaft a^{11} the other fly wheel will be simultaneously connected therewith to drive said shaft. It is to be understood that there is an intermediate position where both clutches are disengaged from the fly wheels. As is usual in the particular form of clutch which I have illustrated here the shoes are preferably made of wood and are somewhat elastic and this elasticity permits the sliding collar to be pushed a trifle past the center of oscillation of the toggle rods so as to lock the shoe in frictional engagement with the internal rim of the fly wheel. The operating means for the clutches consists of a bell crank b^8 which is secured to the stud b^9 , journaled loosely in the frame of the machine. One of the free ends of the bell crank b^8 connects with a rod b^{10} which rod in turn is connected with the ordinary hand lever (not shown) located at the rear of the machine. The other free end of the bell crank b^8 is

pivotaly connected with a link b^{11} (shown in dotted lines in Fig. 2) and this link, b^{11} , is pivotaly connected to a supporting arm, b^{12} , which projects from the stud, b^{13} , being rigid therewith. The stud, b^{13} , at its upper end, is rigidly secured to the yoke, b^{14} , which engages the clutch collar, b^3 , so that when the stud, b^{13} , is oscillated by the arm, b^{12} , the yoke, b^{14} , will move to operate the clutch collar.

The parts, as shown in Fig. 2, have been thrown to cause the fly wheel, a^{13} to drive the shaft and gear wheel a^9 in one direction. Consequently, when the rod b^{10} is pushed forward (away from the rear of the machine) the bell crank b^8 is oscillated which in turn moves the connecting link b^{11} and oscillates the stud b^{13} which is operatively connected with the clutch collar b^3 to slide the collar b^3 away from its companion fly wheel a^{13} and thereby release the shoe b^7 from engagement. This movement of the bell crank simultaneously rocks the stud b^9 and said stud being connected with the clutch collar b^2 throws the clutch collar toward its companion fly wheel a^{14} and thereby forces the shoe b^6 in engagement with the said fly wheel to reverse the movement of the shaft a^{11} and gear a^9 for reversing the machine. It is apparent that the fly wheel a^{13} will continue to rotate in a reverse direction to that of the wheel a^{14} and this idle fly wheel will generate momentum to assist the opposing fly wheel at any moment when excessive load is met by said last mentioned fly wheel. For instance, if the teeth of the pinion a^{17} acting now to drive the beveled wheel a^{16} , which is operatively connected to the carrying wheels of the machine, should be retarded in its movement by obstructions met by the traction wheel, the gear a^{16} on the fly wheel a^{13} will assist the pinion a^{17} by reason of momentum stored up in the fly wheel a^{13} which has theretofore been moving independent of the load upon said pinion.

Having described my invention, I claim as follows:—

1. In a traction engine, the combination of a driving engine with a longitudinal driving shaft, an axle for supporting the driving engine located at right angles to said longitudinal driving shaft, a driven shaft substantially at right angles to said driving shaft, two opposing flywheels, two clutch members, said clutch members being on said driven shaft, means connected with said driving shaft for driving said flywheels continuously but in opposite directions, gears between said clutch members and the supporting axle, and means for operating said clutch members whereby one of said members may rotate in unison with a fly-wheel while the other opposing flywheel rotates continuously free from its corresponding clutch member allowing its momentum to

assist the other flywheel, substantially as specified.

2. In a machine of the character mentioned, the combination of a traction engine
5 with a driving shaft, an axle for said traction engine, said axle being located at right angles to the driving shaft, a driven shaft, two opposing fly wheels, and clutch members on the driven shaft, connections between
10 the driving shaft and fly wheels for driving said flywheels continuously but in opposite directions, and means for operating said clutch members into and out of engagement

with said flywheels whereby either of said flywheels may rotate in unison with its clutch member while its associated flywheel will rotate continuously and its momentum assist the first mentioned flywheel gears between the axle and the clutch members, substantially as specified. 15 20

In testimony whereof, I have hereunto set my hand this 9th day of January, 1908.

ANDREW W. AITKEN.

Witnesses:

CHAS. I. WELCH,
MARJORIE S. MORROW.