No. 703,872. Patented July 1, 1902.

J. O. WELLS.

TRACTION ENGINE.

(Application filed Oct. 1, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

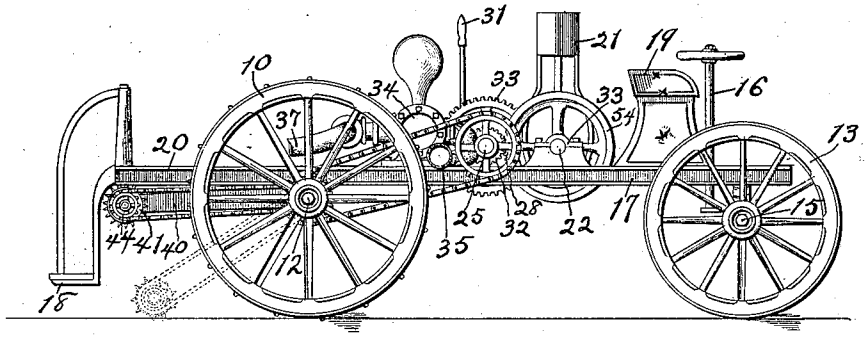
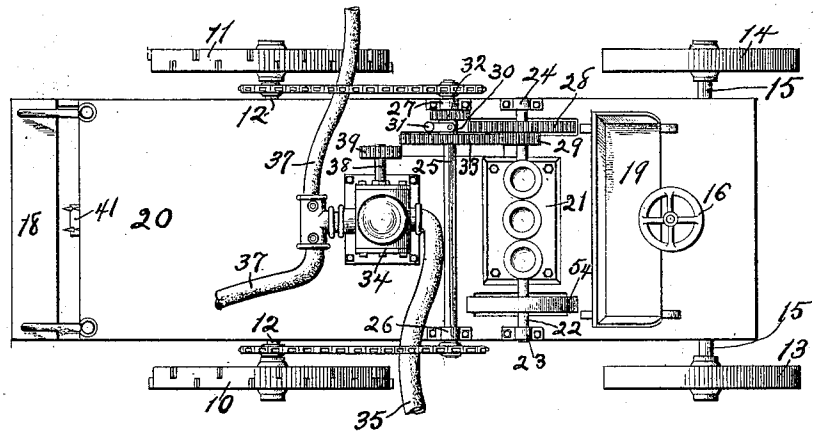


Fig. 2.



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Fig. 3.

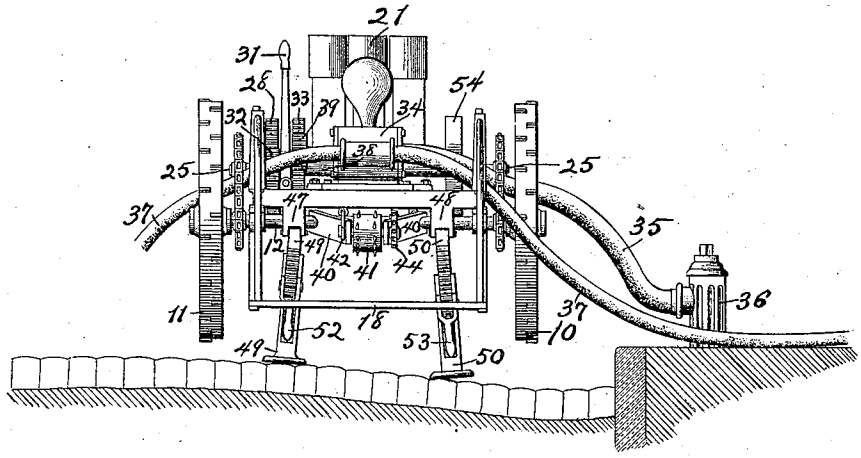


Fig. 4.

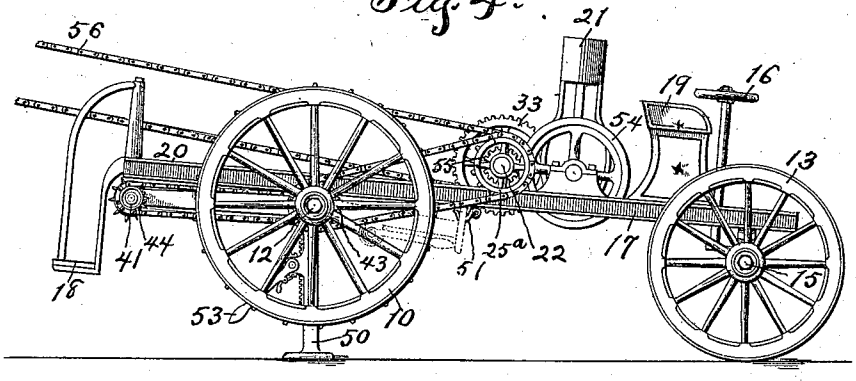
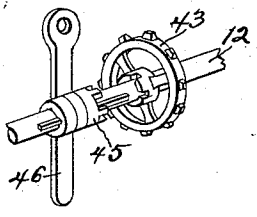


Fig. 5.



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UNITED STATES PATENT OFFICE.

JESSE O. WELLS, OF DES MOINES, IOWA.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 703,872, dated July 1, 1902.

Application filed October 1, 1900. Serial No. 31,637. (No model.)

To all whom it may concern:

Be it known that I, JESSE O. WELLS, a citizen of the United States of America, and a resident of Des Moines, Polk county, Iowa, have invented certain new and useful Improvements in Fire-Engines, Traction-Engines, Motor-Vehicles, &c., of which the following is a specification.

The object of this invention is to provide improved means to be employed as a traction-engine or power-engine, or a combined traction and power engine, susceptible of use in locomotion and in the driving of machinery, either independently or conjunctively.

A further object of this invention is to be found in the provision of means for driving a carriage, truck, or other locomotive along a surface by power carried thereby and when the same has reached its destination so arranging and shifting the mechanism as that the engine may be employed in driving auxiliary mechanism and the traction-wheels employed as balance-wheels for the engine and auxiliary mechanism combined.

Another object of my invention is to be found in the provision of means for elevating the traction-wheels of the machine from the ground or other tread-surface to the end that said traction-wheels may be employed as driving balance-wheels.

A further object of my invention is to be found in the provision of means auxiliary to the traction-wheels for advancing the machine along the tread-surface under unfavorable conditions; and a further object of my invention is to be found in the provision of means for disconnecting or ungearing this auxiliary advancing mechanism when the traction-wheels are successfully performing their function.

A further object of my invention is to provide means for elevating the traction-wheels either manually through the use of lifting-jacks or mechanically through the use of jacks combined with a slight advancement of the machine.

A further object of my invention will be found delineated in the structure, whereby the same traction and driving mechanisms may be employed in the operation and propulsion of machines of widely-varied characteristics and functions, such as fire-engines, pumps, fodder-shredders, threshing-machines, corn-shellers, and the like.

My invention consists, primarily, in the combination of a wheeled truck, an engine mounted thereon, gear connections between the engine and traction-wheels of the truck whereby said traction-wheels are driven, and gearing between said engine and a machine to be driven, which connections may be varied as to speed or times of relative operation, together with means for elevating the traction-wheels, whereby said traction-wheels may be employed as balance-wheels in the operation of the machine being driven by the engine.

My invention consists, further, in the combination of an engine, a truck carrying said engine, variable power-transmitting mechanism between the engine and traction-wheels of the truck, together with a machine to be driven, and controllable power-transmitting mechanism between the engine and machine to be driven, and means for raising the traction-wheels for revolution above the tread-surface at times or during the operation of the machine being driven.

My invention consists, further, of a wheeled truck, an engine mounted thereon and geared to the traction-wheels of the truck, a frame hinged conjunctively with the axes of the traction-wheels of the truck, and a pick-wheel carried in the extremity of said frame and geared to the traction mechanism, which pick-wheel may be thrown into or out of gear or not, as desired.

My invention consists, further, in a fire-engine truck carrying an engine and pump and provided with traction-wheels geared to the engine by such connections as will reduce the speed between said engine and wheels, which gear connections may be shifted to increase the speed of the wheels and at the same time drive the pump, together with means for elevating the traction-wheels.

My invention consists, further, in the construction of a wheeled truck, traction mechanism thereon, an engine on said truck and susceptible of arrangement to drive said traction mechanism, means for steering the truck, a pump on the truck, and gear connections susceptible of arrangement whereby the en-

gine may drive the pump and traction-wheels at an increased speed, together with means for elevating the traction-wheels.

My invention consists, further, in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation illustrating my invention as adapted to a fire-engine, the dotted lines indicating the operative position of the pick-wheel. Fig. 2 is a plan of the device shown in Fig. 1. Fig. 3 is a rear elevation of the device shown in Figs. 1 and 2, illustrating said device in actual use in pumping water from a fire-plug and discharging the same through two hose, the traction-wheels being elevated by means of jacks supported in bracing positions by a street-pavement. Fig. 4 is a side elevation illustrating my invention adapted to an automobile or traction-truck susceptible of use in and arranged in position for driving a threshing-machine (not shown) or other extraneous machine. Fig. 5 is a perspective of a clutch mechanism whereby the pick-wheel gearing with the traction mechanism is controlled manually.

In the construction of the machine as shown the numerals 10 11 designate traction-wheels mounted rigidly on and supporting an axle-shaft 12, and the numerals 13 14 designate steering-wheels mounted on and supporting a front axle 15 and susceptible of control manually through the medium of a steering device 16. The traction-wheels, axle-shaft, steering-wheels, steering-axle, and steering device may be of any desired form and of any suitable construction susceptible of the operations and functions hereinafter described and set forth. A truck-frame 17 is mounted on and above the axles 12 15 and normally occupies a plane approximately horizontal. A step 18 is suspended from the rear end portion of the truck-frame 17 and is designed for use in a common manner to carry two or more firemen or attendants to the scene of a conflagration in such positions relative to the operating mechanism of the machine as will be most convenient for the initiation of the pumping functions of the machine when its destination is reached. A seat 19 is located on the forward portion of the truck-frame 17 in such position as may be convenient to support a fireman whose duty it is to guide the advance of the machine upon a street or roadway and control such advance and the determination thereof. The truck-frame 17 may be and preferably is covered by a suitable bed or platform 20.

An engine 21 of any desired and suitable construction is mounted upon the bed 20 immediately in the rear of the seat 19. I have illustrated in a general way one of the ordinary types of gas-engines employing vertical cylinders and a horizontal main shaft 22, mounted for rotation in boxes 23 24, carried by the bed; but any other suitable engine may be employed. A counter-shaft 25 is mounted horizontally parallel with the main shaft 22 of the engine and in the rear thereof and is arranged for rotation in boxes 26 27, carried by the bed. The counter-shaft 25 is connected by a sprocket-gearing with the axle-shaft 12 at points adjacent to the traction-wheels on either side of the bed. A large spur-gear 28 is mounted on one end portion of the engine-shaft 22, and a small spur-gear 29 is mounted on said engine-shaft adjacent to the large spur-gear and may be attached thereto, if desired. A sleeve 30 is mounted for rectilinear movement on the counter-shaft 25 and is keyed or otherwise connected with said counter-shaft in such a manner as to revolve therewith. This sleeve 30 is under the control of a shifting-lever 31, fulcrumed in and rising from the bed 20 and by means of said lever manually actuated may be moved lengthwise of the counter-shaft. The sleeve 30 carries a small pinion 32, rigidly connected therewith and arranged for engagement with the large spur-gear 28 at times, and also carries a large pinion 33, rigidly connected therewith and shaped and arranged for engagement with the small spur-gear 29 at times.

A rotary pump 34 is mounted on the bed 20 in the rear of the counter-shaft 25 and may be of any desired and suitable construction, preferably susceptible of the operation of receiving water through a hose 35 from a fire-plug 36 or other source of water-supply and discharging said water through one or more hose 37 37 and employing a horizontally-positioned driving-shaft 38. The shaft 38 is provided with a small pinion 39, rigidly mounted thereon and shaped and arranged for engagement at times with the large pinion 33 on the sleeve 30 of the counter-shaft 25.

A frame 40, composed of two or more bars braced or otherwise connected, is hinged at one end by pivotal mounting upon the axle-shaft 12 beneath the central portion of the bed 20, and said frame is of such a length as comprises the space between said axle-shaft and the rear end of the bed. A pick-wheel or spider-wheel 41 is mounted for revolution in the rear end portion of the frame 40 and is of such shape as to engage the tread-surface over which the machine is to be advanced at times. A hook 42 is provided whereby the rear portion of the frame 40 and the pick-wheel 41 may be suspended in close proximity to the rear end of the bed 20. A sprocket-wheel 43 is mounted loosely on the axle-shaft 12 and is connected by a sprocket-chain to a sprocket-wheel 44 on the shaft carrying rigidly the pick-wheel 41. A clutch member is formed on the sprocket-wheel 43 and may be engaged at times by a clutch member 45, keyed to the shaft 12 and controlled by a hand-lever 46, fulcrumed to the bed or truck-frame and depending therefrom. This hand-lever 46 may project through the bed or may be positioned conveniently to the firemen riding on the step 18 of the machine.

Bearings 47 48 are mounted on the truck-frame or bed and depend therefrom, and the axle-shaft 12 runs freely in said bearings. Ears are formed on and depend from the bearings 47 48, and lifting-jacks 49 50 are hinged between said ears and extend downwardly and forwardly relative thereto. Thus are the heads or reciprocating portions of the jacks securely connected with the axle-shaft 12. The construction of the heads of the jacks and the bearings 47 48 should be such as to prevent said jacks swinging downwardly and rearwardly beyond a vertical plane, and in relation to each other said jacks should diverge from their hinging-points to the end that the bases thereof shall be separated a greater distance than the heads are separated. The bases of the jacks are apertured to admit hooks 51, depending from the truck-frame or bed, whereby the jacks are suspended beneath the bed and clear of the ground or tread-surface. The heads of the jacks are formed with racks arranged to be engaged by lifting pawls or pinions operated by levers 52 53, carried by the bases of the jacks, and the bases of the jacks are broadened at their lower ends for engagement with and support by the street-pavement, roadway, or other tread-surface.

The gearing is arranged as shown in Figs. 1 and 2 of the drawings when it is desired to move the machine to the scene of a conflagration, and when the engine is started the motion of the main shaft 22 is communicated through the small spur-gear 29, large pinion 33, sleeve 30, counter-shaft 25, and sprocket-gearing to the traction-wheels and axle-shaft 12, and said motion is reduced in speed by the reducing train of gear between the engine and wheels. The traction-wheels by the well-known process advance the truck and devices carried thereby under the control of the engineer and steersman. Sometimes the machine may become stalled, by reason of mud or a slippery street-surface or an accumulation of snow, and the traction-wheels under such circumstances may fail to advance the machine as it is desired they should do. Under such conditions the clutch 45 should be thrown into engagement with the sprocket-wheel 43 and the frame 40 should be released from the hook 42 in order that the pick-wheel 41 may engage the tread-surface and by reason of its toothed or serrated periphery tenaciously engage or wear a contact-surface and exert a traction influence in aid of the traction-wheels. By the use of the pick-wheel in this manner the machine may readily be advanced against obstructions and under conditions superior to the unaided capacity of the traction-wheels. When the scene of the conflagration has been reached, one of the firemen connects the hose 35 with the plug 36 or other source of water-supply, while another or several of the firemen and attendants perform the following operations: The shifting-lever 31 is operated to move the sleeve 30 along the counter-shaft 25, disconnecting the pinion 33 from the small spur-gear 29 and connecting it with the small pinion 39 on the pump-shaft 38 and at the same time connecting the small pinion 32 with the large spur-gear 28. Both jacks 49 50 are released from their hooks 51 and dropped to the ground, and manual force is applied to the levers 52 and 53 to the extent necessary to lift the axle-shaft 12 and raise the traction-wheels from the ground, and one or both of the hose 37 37 are directed upon the fire. The engine is now started and the motion of its shaft is conveyed through the large spur-gear 28 and small pinion 32 to the sleeve 30 and from said sleeve in two directions, the one portion through the large pinion 33 to the pinion 39 on the pump-shaft 38 and the other portion through the counter-shaft 25 and sprocket-gearing to the axle-shaft 12 and traction-wheels. The train of gearing between the engine and pump is of such a character as to greatly increase the speed of the pump relative to that of the engine, and the train of gearing now employed between the engine-shaft and traction-wheels is the reverse of that previously employed in respect of the varying of speed and is such as to drive the traction-wheels at a rate vastly superior to the speed of the engine-shaft.

In the use of the machine as a traction-engine or automobile the engine is steadied by a balance-wheel 54 on its shaft, and this balance-wheel is sufficient for such need; but when the machine is transformed into a pumping-engine greater balancing power is desirable, and hence the provision for the use of the traction-wheels as balance-wheels. From the same cause arises the desirability of shifting and increasing the train of gear between the engine-shaft and traction-wheels to the end that when the machine is employed as a pumping-engine the traction-wheels may have the speed and regularity of motion characteristic of balance-wheels. The balance-wheel 54 may continue to perform its functions after the transformation of the machine, or the structure may be made such as to dispense with it under these conditions.

As I have illustrated the machine in Fig. 4 the pump is removed and a sprocket-wheel 55 is mounted on the counter-shaft 25 and carries a chain 56, susceptible of connection to a threshing-machine or other extraneous mechanism to be driven thereby. Under these conditions of structure the machine partakes of the characteristics of a combined traction and driving engine susceptible of application to and the operation of any mill or machine arranged for power driving. When used as a traction-engine or while being transported from place to place, the machine would be detached from the chain 56, and said chain would be applied only when it is desired to make a connection to a follower.

I desire to be understood as comprising in my invention desirable and suitable variations of gearing and the employment of mechanical equivalents susceptible of similar operations and the performance of similar functions, and therefore I do not limit myself to the specific gearing employed, the specific engine I have illustrated, nor the specific truck delineated herein.

Sometimes it may be desirable to stop the machine at its destination, throw down the jacks and pick-wheel frame, and then move the machine forwardly by the operation of the engine and pick-wheel until the jacks are brought into vertical planes beneath the axle-shaft 12, and in reaching such vertical planes raise the axle-shaft the desired degree to clear the traction-wheels from the tread-surface. The pick-wheel then serves as a brace when unclutched from the axle-shaft or may be hung again to the frame of the truck.

Owing to the diverging or spreading of the jacks 49 50 they serve as lateral braces to limit and minimize the lateral vibration of the machine in use.

I claim as my invention—

1. In an automobile, fire-engine or motor-vehicle, the combination of the wheeled truck, the engine on said truck, reducing-gear connections between said engine and the traction-wheels of the truck, gear connections between said engine and the machine to be driven and means for elevating said traction-wheels.

2. In an automobile, fire-engine or motor-vehicle, the combination of the traction-truck, the engine thereon, the machine to be driven, means for elevating the traction-wheels and shiftable power-transmitting connections between the engine and traction-wheels and between the engine and machine to be driven.

3. In a traction-engine the combination of the traction-truck, lifting-jacks hinged adjacent to the rear axle of the truck and arranged for manual actuation independent of each other whereby said traction-truck may be elevated to clear the traction-wheels from the tread-surface and means for attaching said traction-engine to a machine to be driven.

4. In a traction-engine the combination of the traction-truck, the pick-wheel hinged to and arranged for vertical oscillation or adjustment on the rear axle of said truck and geared thereto; and a clutch connecting the gearing of the pick-wheel to the rear axle of the truck and arranged to be disconnected from said pick-wheel at times, and means for connecting said traction-engine to a machine to be driven.

5. In a traction-engine the combination of the traction-truck, the pick-wheel hinged and geared to the rear axle of said truck and clutch mechanism interposed between said pick-wheel gear and rear axle.

6. In a traction-engine the combination of the traction-truck, the lifting-jacks hinged thereto and arranged in divergent planes relative to each other and means for attaching said traction-engine to a machine to be driven.

7. In a traction-engine the combination of the traction-truck, the jacks hinged thereto and arranged for independent elevation whereby the truck may be leveled on an inclined or irregular surface and means for attaching said traction-engine to a machine to be driven.

8. In a machine of the class described the combination of the wheeled truck, the engine thereon, the machine to be driven carried on said truck and shiftable gear connections between said engine and the traction-wheels and between said engine and the machine to be driven, together with jacks located in divergent planes whereby the truck may be elevated, which jacks are susceptible of independent elevation.

9. In a machine of the class described the combination of the traction-wheels, the engine, the machine to be driven and means for elevating said traction-wheels, together with gear connections between said engine, traction-wheels and machine to be driven whereby in the elevation of said traction-wheels they partake of the characteristics of balance-wheels for the engine and driven machine.

10. In a machine of the class described the combination of the traction-wheels, the engine, the machine to be driven, means for elevating said traction-wheels and shiftable gear connections between the engine, traction-wheels and driven machine.

Signed at Des Moines, Iowa, this 4th day of June, 1900.

JESSE O. WELLS.

Witnesses:

WEBSTER BISHOP,

S. C. SWEET.