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S. S. HANKS.
Road-Engine.

No. 217,941. Patented July 29, 1879.

Fig-1.

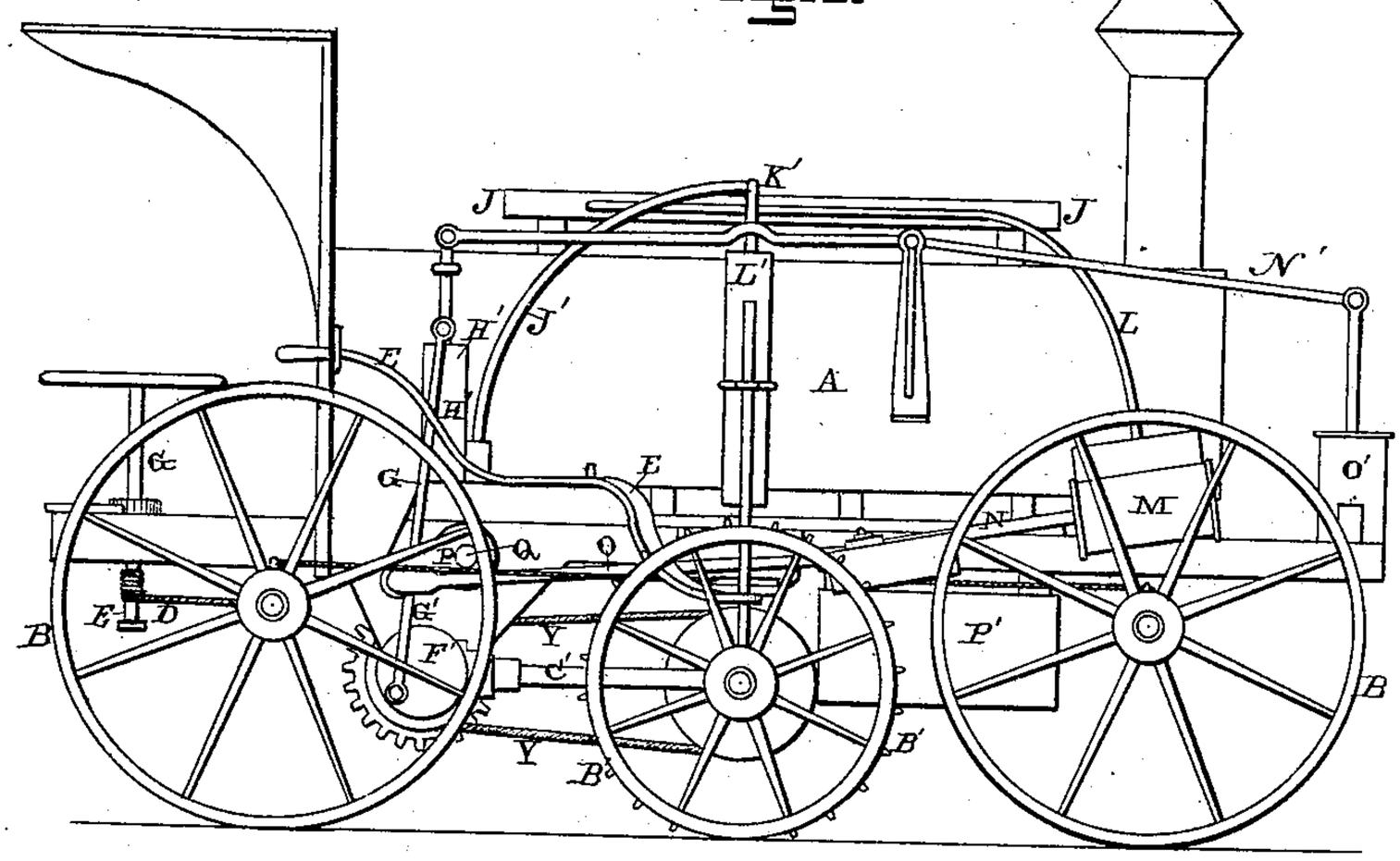


Fig-2.

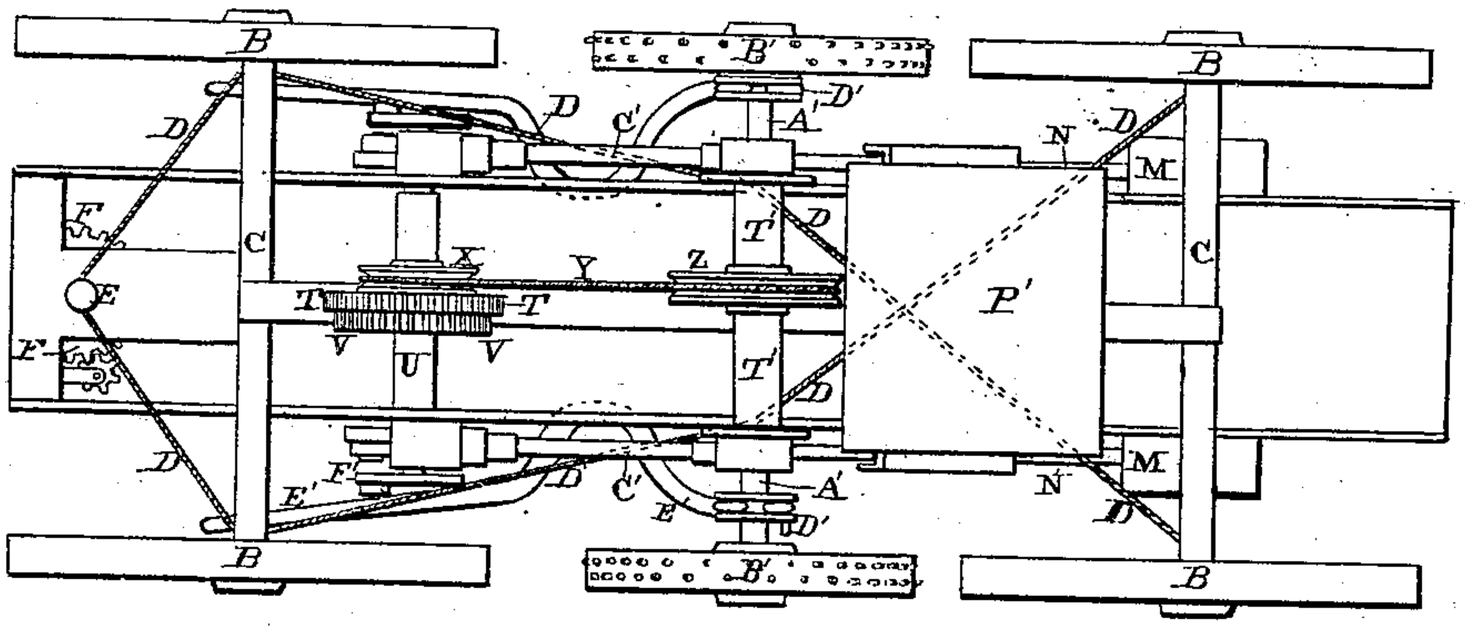


Fig-4.

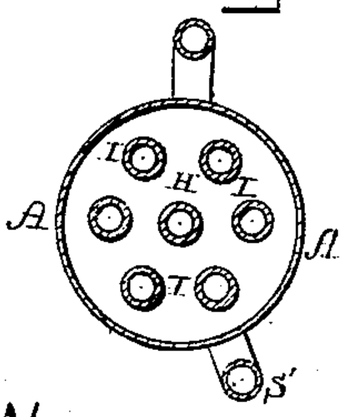
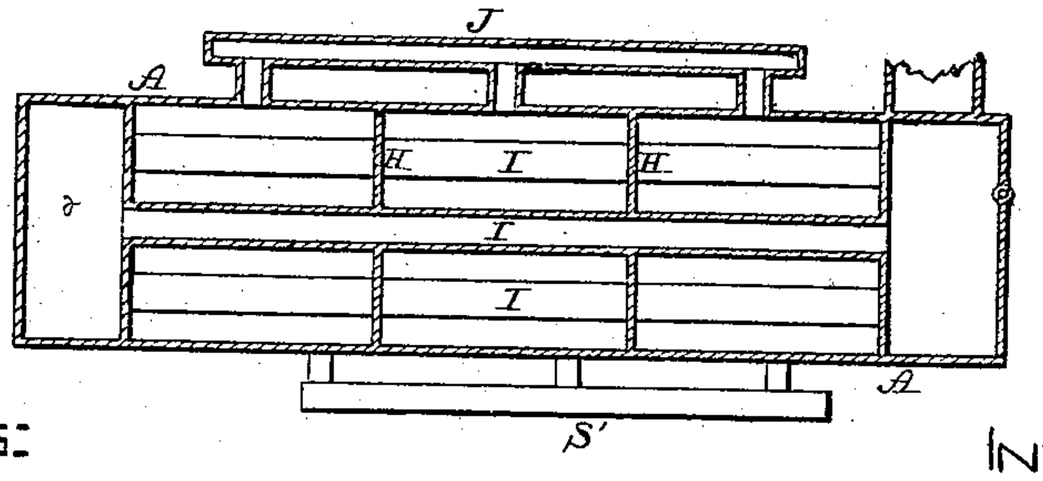


Fig-3.



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2 Sheets—Sheet 2.

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Fig. 5

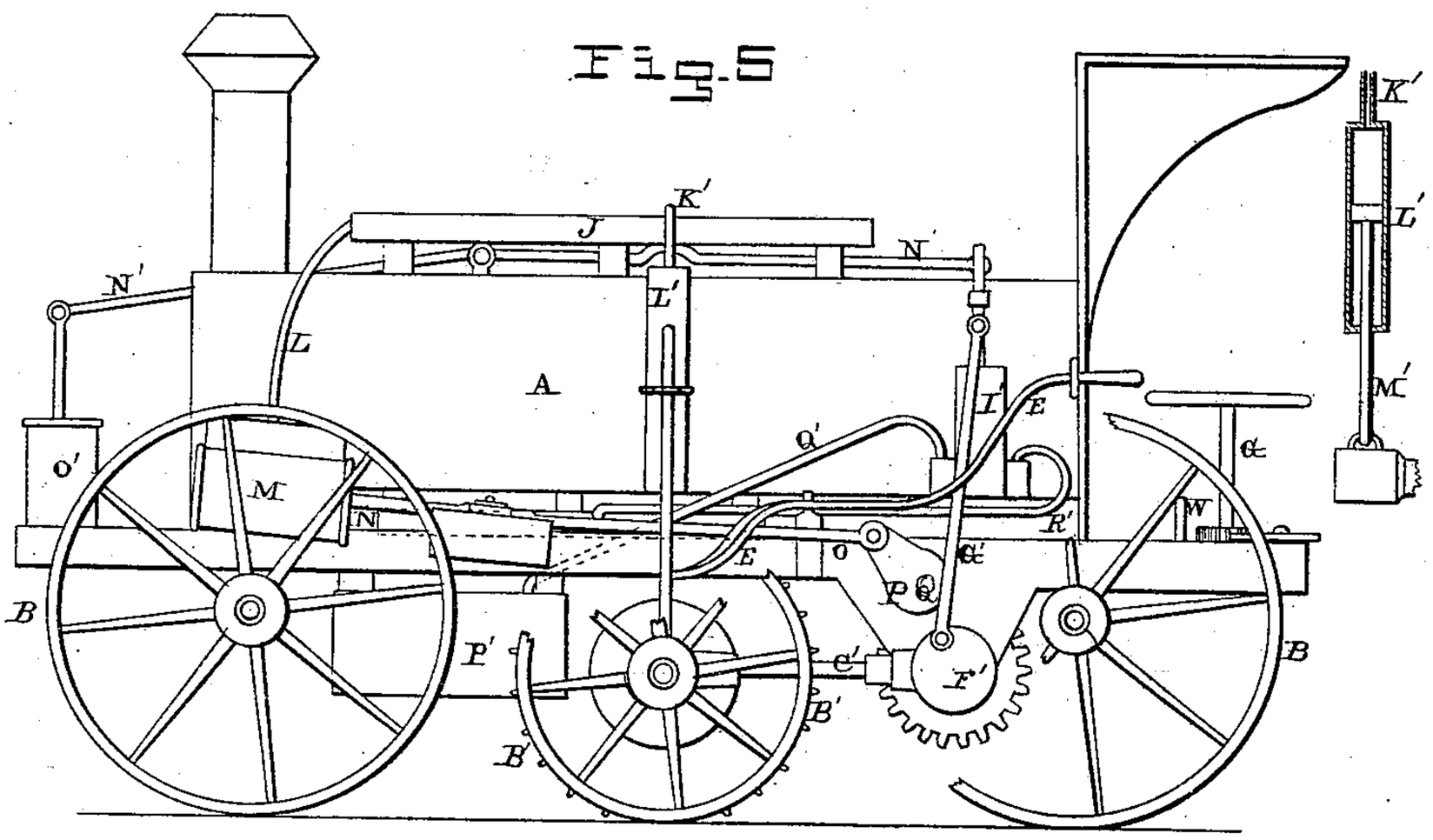


Fig. 6.

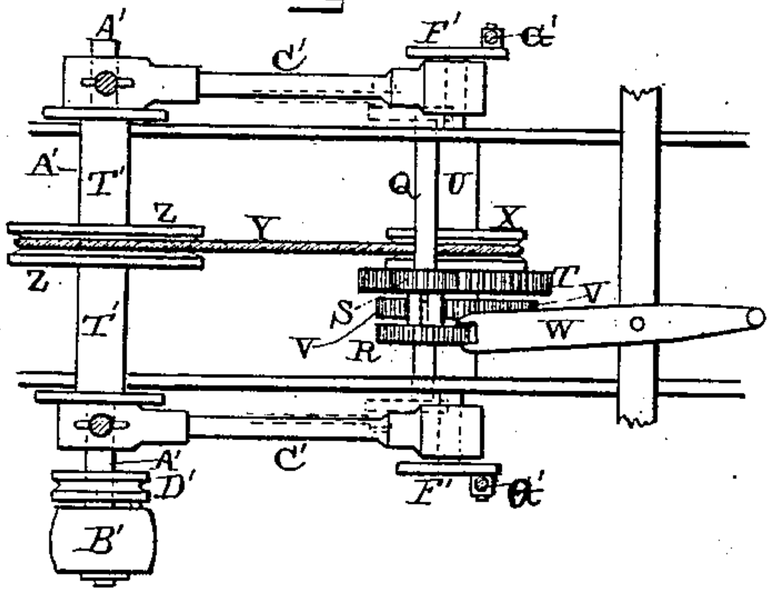
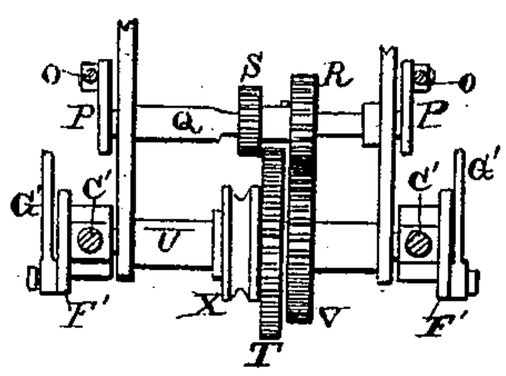


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE

SAMUEL S. HANKS, OF PRINCETON, IOWA.

IMPROVEMENT IN ROAD-ENGINES.

Specification forming part of Letters Patent No. **217,941**, dated July 29, 1879; application filed June 12, 1879.

To all whom it may concern:

Be it known that I, SAMUEL S. HANKS, of Princeton, Scott county, Iowa, have invented a Steam Road and Farm Motor, of which the following is a specification.

The object of my invention is to produce a steam-motor suitable for common roads and for draft and stationary purposes on the farm, combining in the one machine a motor capable of drawing a wagon or train of wagons over any ordinary roads, muddy or dry, hilly or level, with the same facility that it can be done with horses, and at a less expense; also, capable of drawing a train of plows or doing any draft work on the farm, with the advantages of being quickly changed into a stationary engine for the purpose of running a thrashing-machine or saw, drilling wells, hoisting, pile-driving, &c.; also, capable of having hose attached and being used as a fire-engine.

The principal features of my motor are a boiler and engine resting on four supporting-wheels, the whole being propelled or driven along by too driving-wheels supplied with movable or adjustable spikes, spurs, or lugs, the said drivers being so arranged with appliances hereinafter described that they have perfect freedom of motion, and will adapt themselves to any inequalities of ground-surface without losing their tractive or propelling power, and they can also be made to revolve fast or slow, as greater or less speed or power is required, by simply moving a shifting-lever. The whole weight of the boiler and engines rests upon springs, thus obviating any unpleasant and injurious jolting, and the whole machine is easily managed and guided by one man by the aid of an ingenious application of tiller-ropes and wheel. When the motor is to be used as a stationary engine, the driving-wheels can be raised up and a belt-wheel or pulley clamped or bolted to either driver, as is most convenient for the special service needed.

Figures 1 and 5 are side elevations of my invention, taken from opposite sides. Fig. 2 is an inverted view of the same. Fig. 3 is a longitudinal section taken through the center of the boiler. Fig. 4 is a vertical cross-section of the same. Fig. 6 is a plan view of the mechanism connected with the two additional traction-wheels, and Fig. 7 is a side elevation of the same.

A represents the boiler, which is supported upon the four supporting-wheels B in any suitable manner. The two axles C of these supporting-wheels B are connected together by means of the cross-chains D, which chains have their rear ends wrapped around the lower end of the shaft E, which shaft has the gear-wheel F connected to its upper end. Passing down through the floor of the cab is the shaft of the hand-wheel G, which shaft has a small worm-gear or pinion secured to it for meshing with and operating the gear-wheel F and its shaft. By means of this arrangement of parts the supporting-wheels are made to turn the engine in any desired direction. These wheels B have none of the driving mechanism connected to them in any way.

The boiler is divided vertically by the partitions H into two, three, or more compartments, as shown in Fig. 3, so as to prevent the water, when the engine is going uphill or is in an inclined position, from running all down to one end. The flues I pass through all the chambers alike, so that the water will be equally heated in each compartment. These three compartments are connected together by means of the steam-drum J, and from this drum the steam is conveyed through the pipe L to the two driving-cylinders M. The piston-rods N are connected by the rods O with the cranks P on the ends of the shaft Q. Upon this shaft Q are feathered the two pinions R S, which are connected so as always to move together. The pinion S of these two is much the smaller, and is made to gear with the large driving-wheel T on the shaft U when it is desired that the machine should go slowly. When a more rapid motion is desired, the larger pinion, R, is brought into play with the smaller driving-wheel, V. These two pinions R S are shifted back and forth upon their shaft by means of the lever W, which projects backward under the cab and has its rear end to project up through the floor of the cab, so that the operator can readily move it with his foot, and thus change the speed of the engine at will.

Upon the shaft U is secured a sprocket-wheel, X, from which motion is given through

the chain Y and sprocket-wheel Z on the shaft A′ to the two driving-wheels B′, which are located in between the wheels B, as shown. The shaft A′ is connected to the shaft U by means of the connecting-rods C′, which rods have their rear ends only pivoted upon the shaft U, so as to allow the shaft A′ a vertical play. The wheels B′, when not locked to the shaft A′ by the clutches D′, turn idly around, so that either one or both may be instantly thrown out of gear by means of the lever E′, which extends back to the cab. By thus making these auxiliary wheels B′ loose upon the shaft, and providing them with clutches, so that they can be thrown in or out of operation at any moment, the forward motion of the machine may be checked at any time without in any way interfering with the operation of the other parts of the engine. Upon each end of the shaft U is placed a crank, F′, which are connected by means of the rods G′ with the air-pump H′ on one side and to the feed-water pump I′ on the other side.

Leading from the bottom of the air-pump H′ is the pipe J′, which conducts the compressed air to the pipe K′, which extends across the top of the boiler, and has its two ends connected to the two air-cylinders L′. Connected to the pistons in these cylinders L′ are piston-rods M′, which have their lower ends connected directly to either the shaft A′ or the connecting-rods which connect the shafts A′ and U together. The compressed air, bearing down upon the tops of the pistons in these air-cylinders, forces the auxiliary driving-wheels B′ downward against the ground, so as to compel them to take such a hold as will propel the whole engine forward whenever so desired, either in the field for drawing plows or along the road for drawing loaded wagons.

It will be seen that the whole propelling power of the engine is applied directly to these two intermediate wheels, B′, and not to the large wheels B at each corner of the machine.

Connected to the upper end of the piston-rod of the air-pump H′ is a long lever, N′, which is fulcrumed upon a suitable bearing on the side of the engine and reaches forward to the front end of the engine, so as to operate the piston in the fire-engine or pump O′. By disconnecting the rear end of this lever N′ from the piston-rod of the air-pump, the fire-engine or pump will never be brought into play until it is so desired; and when it is desired to operate this pump for extinguishing fire, or for any other purpose, the driving-wheels B′ will be thrown out of gear, so as not to move the engine forward, and the air will be allowed to escape freely from the air-pump, so as not to cause unnecessary work, and then the whole power of the engine will be applied to operating the fire-extinguisher alone.

Underneath the forward part of the engine is placed the water-tank P′, which has a pipe, Q′, connected with the feed-water pump I′, and from this pump runs a second pipe, R′, which feeds the water from the pump into the pipe S′, which is connected to each one of the three compartments of the boiler, as shown in Fig. 3. Thus, when the water is pumped into one compartment it will be pumped into the others at the same time.

Upon the driving-wheel shaft A′ are formed the spools or drums T′ for hoisting purposes. Each one of the compartments of the boiler will be provided with a water-gage, and the boiler will be provided with a safety-gage and all the other appliances which are needed in connection with a boiler of this kind. Each one of the pipes above described will be provided with a cock, faucet, or valve, as may be needed, so as to bring it into play or not, as may be desired. These attachments are not here shown in connection with my engine, because they form no special part of my invention.

I am aware that locomotives have been provided with two additional steam-cylinders and pistons moving therein for the purpose of forcing cog-wheels down into a rack placed between the rails, whereby the locomotive is enabled to ascend grades; and this I disclaim.

Having thus described my invention, I claim—

1. In a traction-engine, the combination of the two sets of wheels B, which are arranged under both ends of and entirely support the engine, with a pair of traction-wheels, B′, arranged between the two sets of supporting-wheels, and which wheels B′ propel the engine back and forth, and are always in contact with the ground, as shown.

2. In a traction-engine, the auxiliary pair of wheels B′, in combination with an air-pump and air-cylinders, whereby the wheels may be forced against the ground to any desired pressure that may be necessary, substantially as described.

3. The combination of the shaft Q, to which the power of the engine is applied, the pinions S R, of unequal size, the shaft U, wheels T V, of unequal size, a connecting mechanism, and a shaft, A′, substantially as shown.

4. In a traction-engine, the shaft A′, journaled in the front end of the connecting-rods so as to have a vertical play, and adapted to be used either in propelling the machine along by means of the wheels B′ or for elevating by means of the drums T′, substantially as set forth.

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