No. 645,630. Patented Mar. 20, 1900.

C. L. & R. A. SCHULTZ.

TRACTION ENGINE.

(Application filed Apr. 20, 1899.)

(No Model.) 4 Sheets—Sheet 1

FIG. 1.

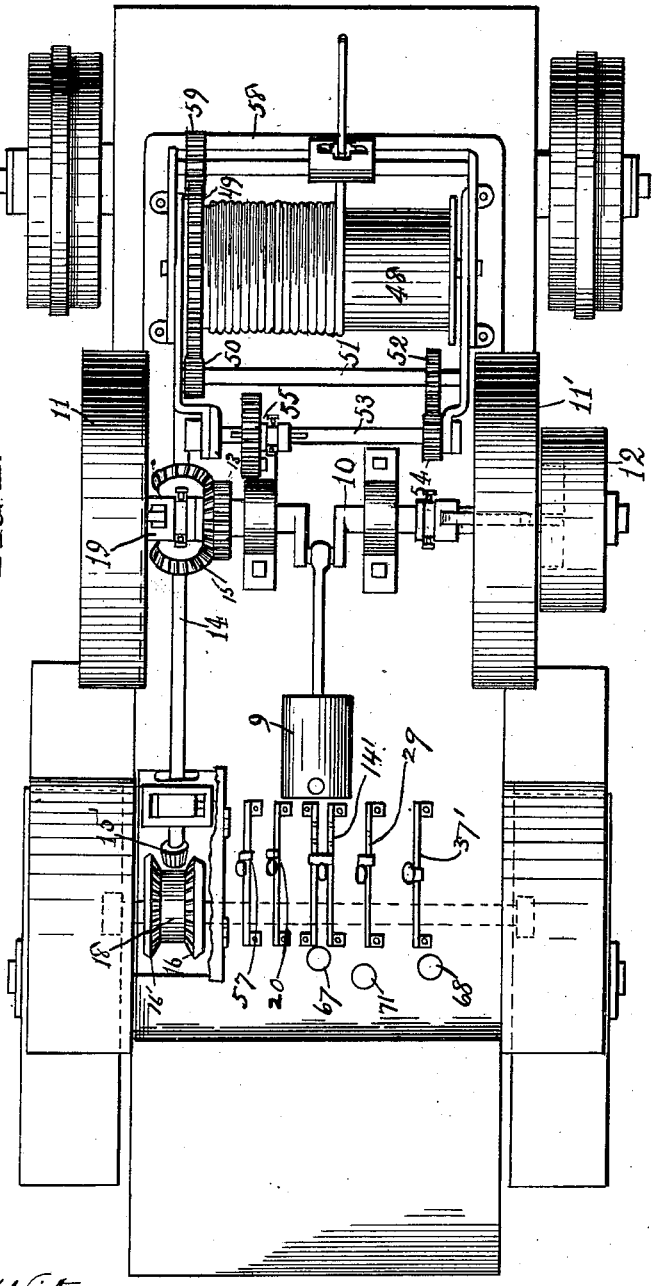


FIG. 3.

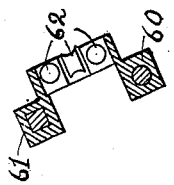
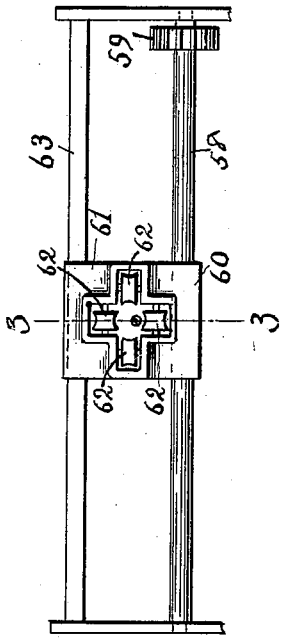


FIG. 2.



Witnesses:
J. Halpenny
William Seafert

Inventors
Charles L. Schultz
Robert A. Schultz
By H. C. Hunsberger
Atty

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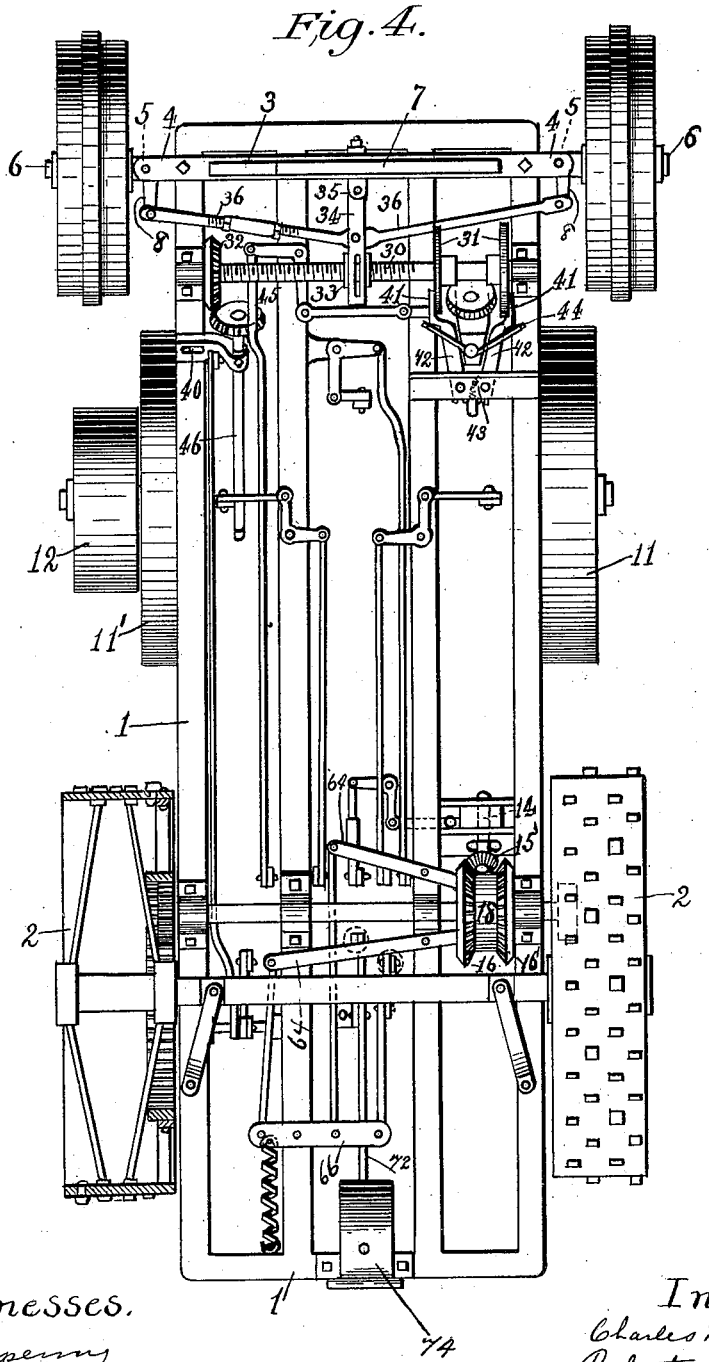
Fig. 4.



Witnesses.
J. Halpenny
William Seafort

Inventors
Charles L. Schultz
Robert A. Schultz
By H. C. Hunsberger
Atty

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(No Model.) 4 Sheets—Sheet 3.

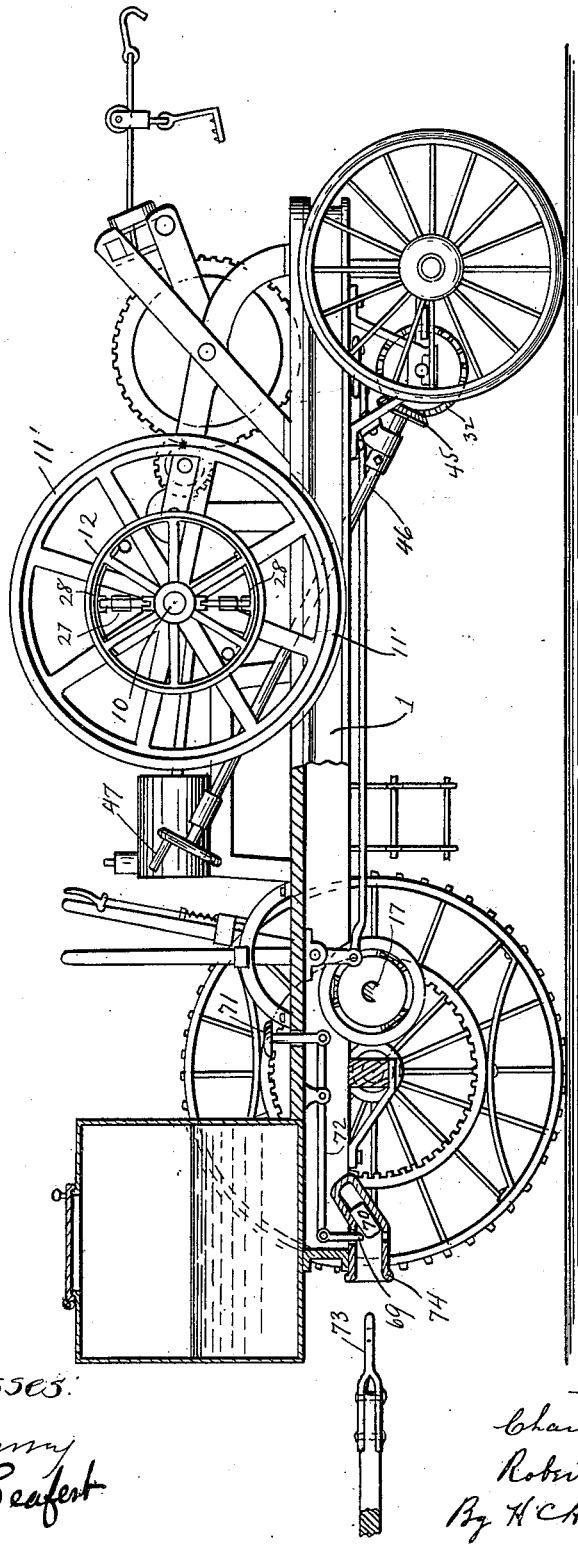

FIG. 5

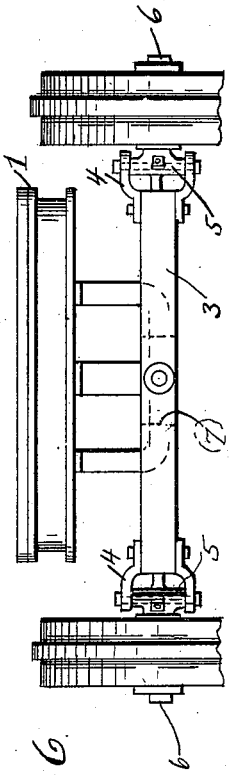

FIG. 6

Witnesses:
J. Halpenny
William Seafert

Inventors
Charles L. Schultz
Robert A. Schultz
By H. C. Hunsberger Att'y

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C. L. & R. A. SCHULTZ.

TRACTION ENGINE.

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(No Model.) 4 Sheets—Sheet 4

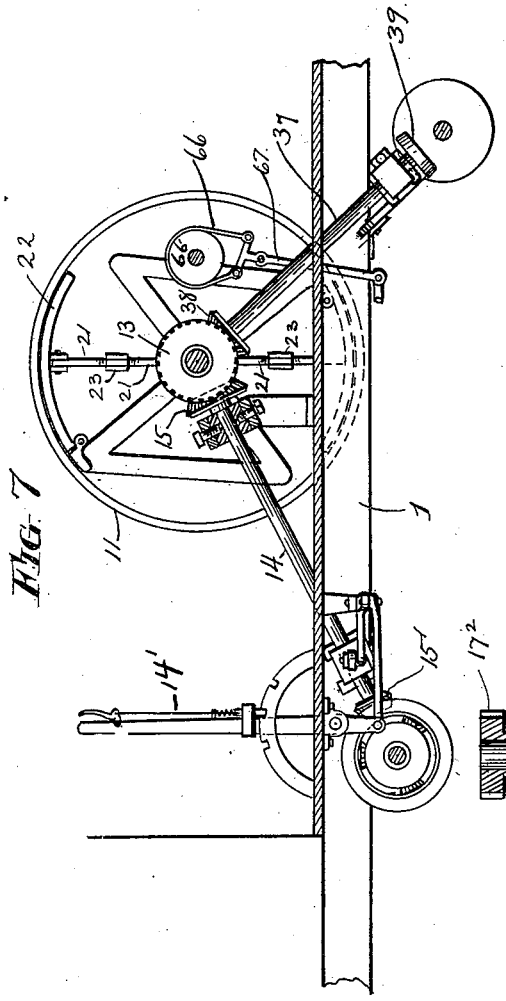

FIG. 7

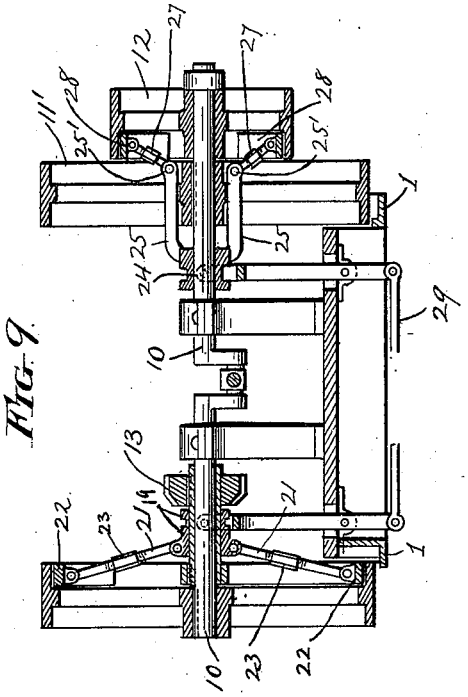

FIG. 9

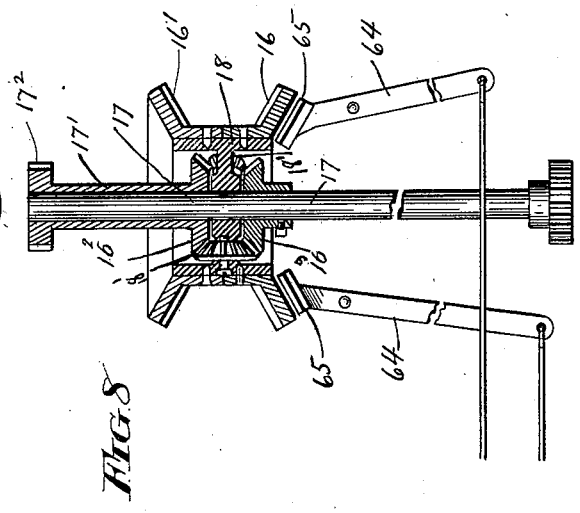

FIG. 8

Witnesses.
J. Halpenny
William Seafert

Inventors
Charles L. Schultz
Robert A. Schultz
By H. C. Hunsberger
Atty

UNITED STATES PATENT OFFICE.

CHARLS L. SCHULTZ AND ROBERT A. SCHULTZ, OF CHICAGO, ILLINOIS.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 645,630, dated March 20, 1900.

Application filed April 20, 1899. Serial No. 713,813. (No model.)

To all whom it may concern:

Be it known that we, CHARLS L. SCHULTZ and ROBERT A. SCHULTZ, citizens of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Traction-Engines, of which the following is a specification.

Our invention relates to improvements in traction-engines by means of which gasolene or explosive engines having but one direction may be utilized as motors by the use of a reversing mechanism in the traction-vehicle, also increasing the utility of the same by improvements in steering-gear, automatic brakes, couplings, and other important elements which contribute to the efficiency of the machine, as will be shown specifically hereinafter.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the traction-engine. Fig. 2 is an enlarged detail of the spooling device. Fig. 3 is a cross-section of the same on line 3 3, Fig. 2. Fig. 4 is an inverted plan view of the traction. Fig. 5 is a side view of the machine with a portion removed to show the coupler. Fig. 6 is an elevation of the front axle. Fig. 7 is a sectional detail showing compensating-gear and reversing and steering gear connections with the driving or main shaft. Fig. 8 is an enlarged horizontal section of compensating gear and brake, and Fig. 9 is a cross-section of the clutch mechanism in the fly-wheels and loose pulley and showing manner of locking the latter to the adjacent fly-wheel.

Similar numerals refer to similar parts throughout the several views.

A frame 1 is mounted on wheels in the ordinary manner. The two rear wheels 2 2 are the traction-wheels, on an axle. The front wheels are provided with an axle 3, constructed of two flat parallel bars joined at the ends and terminating in a fork 4 4, the prongs of the forked ends permitting a post or stanchion 5 5 to be erected vertically between them and adapted to turn or swing in its bearings. From these stanchions projects a spindle 6 6 for the front wheels of the traction. Projecting rearward from said stanchions is an ear 8 8, which forms the connection for a steering-gear hereinafter described. The frame 1 is mounted on the front axle on a block 7, which is pivotally supported by the center of the axle. The engine 9 is placed rearward of the driving-shaft 10 and is provided with the usual mountings and connections with said shaft for the purpose of transmitting motion. The driving-shaft 10 carries two fly-wheels 11 11′ and a loose-pulley wheel 12 on the end of the shaft and outside the fly-wheel 11′. A sleeve on the main shaft 10 carries a combined spur and bevel gear-wheel 13. A tumbling-rod 14, shiftable in one of its bearings, has a pinion on each end and mounted in frame 1 in an inclined position, the pinion 15 on its upper end engaging with the bevel gear-wheel 13 on the main shaft and the pinion 15′ on the lower end of the tumbling-rod engaging alternately with two facing bevel gear-wheels 16 and 16′ on the traction-shaft 17. The traction-shaft is in one piece and is provided with a sleeve 17′, which extends from the compensating gear to the end of the traction-shaft and carries on its outer end a pinion 17^2, which engages with the traction-wheel, and on its inner end one of the two facing bevel-gears 16^2, the other, 16^3, keyed to the traction-shaft. Mounted between the two wheels is a compensating wheel 18, the rim or periphery of which is provided with two facing bevels 16 and 16′ a slight distance apart. Journaled between the hub and rim of the wheel 18 is a series of pinions 18′, preferably three, each of which engages with both of the wheels 16^2 and 16^3 and permits of the rotation of said wheels and the shaft 17 and sleeve 17′ at variant rates of speed without varying the power that is applied to them. This compensating gear accommodates the traction-wheels when departing from a straight line.

The shiftable tumbling-rod 14 by means of the connecting-lever 14′ may be shifted from one side of the double bevel gear-wheel to the other. On the one side it obtains the forward movement, on the other the reverse, regardless of the forward movement of the gasolene-engine. The pinion 15 is in constant engagement with the bevel-gear 13 on the sleeve on the main shaft. A collar 19 on said sleeve is connected with the shifting-lever 20. The collar is provided with lugs 21, set at an angle, and to which are attached the shoes

22, which when the collar is moved outward clutch the inner surface of the rim of the fly-wheel and cause the sleeve and gear-wheel 13 to revolve with the driving-shaft. The lugs 21 are adjustable in their length by means of the turnbuckles 23, by which the friction may be regulated. On the opposite end of the main shaft is another friction-clutch, by which the loose-pulley wheel 12 is locked with the fly-wheel 11'. This clutch consists of a sleeve 24 on the main shaft, provided with two parallel arms 25, which project through the fly-wheel 11' to the loose-pulley wheel 12. On the end of each of said arms is a joint 25', from which extends a lug 27, which engages with a shoe 28, attached at one end to a spoke in the fly-wheel, the other end extending underneath the rim of the loose pulley, thus locking the loose pulley to the fly-wheel by the outward movement of the sleeve. The clutch is set or released by means of the lever 29, which is connected with the sleeve 24.

The steering-gear is provided by means of a shaft 30, mounted in hangers underneath the frame 1, rearward of the front axle. This shaft has two facing friction disks or plates 31 on one end and a bevel gear-wheel 32 on the other end, and is threaded between the friction-plates and bevel-gear, on which travels a nut 33, similarly-threaded and connected with the end of a forked tongue 34, projecting rearward from the center of the front axle by means of a pintle on the upper and lower sides of the nut, which engages with a hole in the prongs of the fork in order that the latter may adapt itself to the movement of the former on the threaded shaft. The tongue 34 is also provided with a joint 35 adjacent to the axle and carries a singletree 36, having its two ends attached by means of a loose bolt to the ears 8 8 on the stanchions 5 5. A shiftable tumbling-rod 37 is mounted in bearings forward of the main shaft and is provided with a pinion 38 on one end to engage with the bevel gear-wheel 13 on said main shaft and on the other end a friction-wheel 39 to engage with the friction-plates 31 on the threaded shaft 30. The tumbling-rod is shiftable to throw the friction-wheel 39 into engagement with one or the other of the friction-plates 31 by the shifting-lever 37' to procure a right or left movement of the front wheels by the traveling nut 33 on its shaft. A brake is provided to check the motion of the friction-plates and is adapted to act automatically, which is constructed of a shoe 41, engaging with the outer side of each of said friction-plates and attached to arms 42, extending rearward and fastened by a bolt to a part of the frame 1. The rear ends of said arms 42 are brought in contact. The shifting of the tumbling-rod into engagement with either of said friction-plates causes its bearing to move against one of said brake-arms 42, releasing the brake. The movement of the one arm also acts upon the other by means of the cams 43 on the rear ends of said arms. When the tumbling-rod is disengaged, the forked spring 44 automatically sets the brake. Should at any time the engine break down, the steering-gear may be operated by means of the bevel gear-wheel 32 on the end of the steering-shaft. A similar bevel-gear 45 is attached to a rod 46 on side of the frame, and by means of a thumb-screw 40 and slot it may be moved into engagement with the wheel 32. The rod 46 is extended to the crank-handle 47 on the frame, where it may be operated by hand.

A drum 48, mounted in bearings in front of the frame 1, is adapted for various uses in connection with this machine. It is provided with a spur-gear 49 on one end, which engages with a pinion 50 on shaft 51, parallel with and in rear of the drum. A larger gear 52 is placed on the opposite end of shaft 51. A second horizontal shaft 53 is mounted in bearings adjacent to and rear of shaft 51. This shaft carries on one end a small spur-gear 54 and on the other end a larger spur-gear 55, which is movable on the shaft and adapted to be moved into engagement with the spur and bevel gear 13 on the main shaft by means of a connecting-rod and bell-crank connection with shifting-lever 57. Forward of the drum is a horizontal shaft 58, which is threaded and provided with a pinion 59, which engages the large spur-gear 49 on the drum. A sleeve 60 on said shaft 58 is threaded to travel on the shaft. Attached to this sleeve and extending upward and integral with it is a frame cruciform in shape, and in each of the four sides or niches is journaled a spool 62, with space between the four spools or center of frame for the passage of the cable. A guide-bar 63 is placed above the shaft 58 and in line with it, on which is hung the upper end of the frame 61 and on which it slides as it is moved on the threaded shaft. This device permits the paying out and winding of the cable on the drum with a minimum of friction and in winding it upon the drum causes it to be laid in even coils.

A brake is provided for the traction-wheels by means of two arms 64, pivoted on the bottom of the frame and carrying on the end of each a brake-shoe 65, Fig. 8, which engages the rim of the bevel-gear 16 on the shaft 17 and operated by means of a double-acting lever 66 underneath the frame 1 and connected with and acted upon by the treadle 67 on the traction-frame. A brake is also provided for the drum by means of a friction-yoke 66 on a pulley-wheel 66' on shaft 53 and which is set and released by the connecting-rod 67 and treadle 68.

An automatic coupling device is affixed to the rear end of the frame, by which the tongue of the separator or other vehicle may be automatically connected with the traction-engine.

A guide-box 74 is attached to the rear of the frame 1. Its interior inclines upwardly,

as shown in the illustration, from the point where the coupling-pin 69 enters. Back of the coupling-pin in the box is a block 70, which is moved back as the draw-bar enters the box, and the coupling-pin falls into the hole in the draw-bar 73. The pin is drawn up by the connecting-bar 72 and treadle 71 and the draw-bar released, when the block 70 slides back and prevents the coupling-pin blocking the path of the draw-bar, but holds it in position to act automatically.

In the operation of the machine the gasolene-motor moves the main shaft in one direction only. To start the machine, we move up the sleeve, carrying the friction-clutch on the left side of the engine by the lever 20, locking the sleeve to the fly-wheel and bringing the bevel gear-wheel 13 into engagement with the pinion 15 on the tumbling-rod 14. The traction-engine now moves forward in a straight line. To reverse the traction-engine, release the friction-clutch by the lever 20 and move up the lever 14′, which shifts the tumbling-rod into engagement with the opposite bevel in the compensating gear. The machine then moves backward. To change the direction of the traction-engine in its forward movement, we set up the lever 37′, which shifts the forward tumbling-rod 37 into engagement with the friction-plates 31 on the threaded shaft 30, causing the nut 33 to move right or left on the shaft 30, according to the engagement of the friction-wheel with one or the other of the friction-plates.

To run the engine for threshing purposes, while the traction is at rest the tumbling-rod 14 is disengaged and the friction-clutch on the right side of the main shaft is set up by means of its connecting-lever locking the loose-pulley wheel 12 to its adjacent fly-wheel and connected with the thresher by means of a belt.

To operate the drum, the spur-gear 55 on the shaft 53 is moved up by its connecting-lever into engagement with the spur on the bevel gear-wheel 13 on the main shaft, which by the intervening shaft 51 and gears communicates with the large spur-gear on the drum.

It will be observed that the various parts of the machine may be operated separately in their relative positions or collectively, as the exigencies of the case may require, and is adaptable to various purposes.

Having thus described our invention, what we claim as new and an improvement on our previous invention, patented October 4, 1898, No. 611,711, and which we desire to secure, is—

1. In a traction-engine, a gasolene-engine having but one direction, a shaft connected with the piston-rod of said engine, a fly-wheel and a loose-pulley wheel on one end of said shaft, a sleeve on said shaft, a friction-clutch on said sleeve consisting of parallel outward-extending arms and through one of said fly-wheels, friction-shoes attached to the spokes of said fly-wheel and extending underneath the rim of said loose-pulley wheel, a lug hinged on the end of each of said arms adapted to cause said friction-shoes to engage the rim of said pulley-wheel and lock said wheel to the fly-wheel and shaft, a lever connected with said sleeve adapted to set and release said clutch.

2. In a traction-engine, a front axle consisting of two parallel bars joined at the ends and terminating in a fork, vertical stanchions pivoted between the prongs of said fork, a spindle projecting outward from the center of said stanchions, an ear projecting rearward from the same, a threaded shaft rearward of and parallel with said front axle, a nut similarly threaded to travel on said shaft, a tongue through the center of said axle extending rearward and pivotally attached to said nut, a joint in said tongue adjacent to said axle, a singletree attached to said tongue and having the ends connected by loose belts with the ears on said stanchions, two facing friction-plates on said threaded shaft, a tumbling-rod, a shiftable bearing for one end of said rod adjacent said friction-plates, a friction-wheel on the end of said tumbling-rod adapted to engage with either of said friction-plates or idle between them, a brake for said friction-plates adapted to act automatically, a lever for shifting the bearing of said tumbling-rod, means for imparting motion to said rod.

3. In a traction-engine, the combination with an engine having but one direction, of a main shaft, a combined spur and bevel gear on said main shaft, a horizontal rotatable drum in bearings on the frame of said traction-engine provided with a spur-gear, a horizontal driven shaft rearward of and parallel with said drum provided with a pinion and a spur gear-wheel, the former to engage with the spur-gear on the drum, the latter to engage with a pinion on a second parallel shaft, a movable spur-gear on said second shaft adapted to engage the spur-gear of the combined spur and bevel gear-wheel on the main shaft, a threaded shaft forward of and parallel with said drum, a sleeve similarly threaded to travel on said shaft, a cruciform frame extending upward from said sleeve and the upper part hung on a guide-rod above said threaded shaft, a spool in each niche in said frame and adapted to carry a cable in winding on and off said drum.

4. A traction-shaft, a sleeve on said shaft, a pinion on the outward end of said sleeve to engage with the traction-wheel, a bevel gear-wheel on the inner end of said sleeve, a similar bevel-gear on the traction-shaft facing said bevel on the sleeve, a compensating gear on said traction-shaft between said facing bevels, a friction-brake to engage with the bevel-gear on the compensating gear, said brake consisting of two arms pivoted to the frame of the traction and provided with friction-shoes to engage said bevel-gear, a lever

connected with said brake, a treadle to operate said lever, a tumbling-rod, a shiftable bearing for one end of said rod adjacent said double bevel-gear, a pinion on said rod adapted to engage either of said facing bevel-gears, a lever for shifting said bearing, means for imparting motion to said rod from a motor having but one direction as specified.

5. In a traction-engine steering-gear, a threaded shaft, a nut to travel on said shaft, a tongue connecting said nut with the center of the front axle in a manner to adapt itself to the movement of said nut on said threaded shaft, an axle for the front wheels of the traction-engine provided with pivotal bearings for said wheels, a singletree hung on said tongue and connected with said pivotal bearings, two facing friction-plates on said threaded shaft, a tumbling-rod, a friction-wheel on said tumbling-rod, a shiftable bearing for said rod, a brake for said friction-plates consisting of an arm extending on each side of the shiftable bearing of said tumbling-rod and provided with shoes to engage said friction-plates, a cam on one of said arms adapted to engage its opposing arm, said arms adapted to be released from engagement with said friction-plates by the shifting of the bearing of said tumbling-rod, a spring for said arms, a lever for said shifting bearing, means for imparting motion to said tumbling-rod substantially as specified.

6. In a traction-engine, the combination with an engine having but one direction of a main shaft, a fly-wheel and loose pulley on the end of said shaft, a movable sleeve on said shaft adjacent said fly-wheel, arms on said sleeve extending outwardly through said fly-wheel, flexible friction-shoes attached to the spokes of said fly-wheel and extending underneath the rim of said loose-pulley wheel, a lug hinged on the end of said arms adapted by the outward movement of said sleeve to impinge said friction-shoes against the rim of said loose pulley, a bevel gear-wheel on a sleeve on the opposite end of said main shaft, a traction-shaft, a sleeve on said traction-shaft, a pinion on one end of said sleeve to engage with the traction-wheel, a bevel-gear on the opposite end of said sleeve, a similar bevel-gear on said traction-shaft facing said bevel on said sleeve, a wheel on said traction-shaft between said facing bevels, the rim of which is provided with two facing bevel gear-wheels, a space between said bevel-wheels, a series of pinions journaled between the hub and rim of said wheel, each engaging both of said bevel-wheels, a shiftable tumbling-rod, a pinion on each end of said rod, one of said pinions adapted to engage the bevel-gear on said main shaft, the other to engage with either of said facing bevels on the traction-shaft, a shiftable bearing for said rod adjacent said facing bevel gear-wheels, levers for moving the sleeves on the main shaft and means for imparting motion to said tumbling-rod.

7. In a traction-engine, the combination with a motor having but one direction of a main shaft provided with fly-wheels and a loose-pulley wheel on one end, a clutch for said pulley adapted to lock said pulley with its adjacent fly-wheel, a bevel-wheel mounted on a sleeve on said shaft, a clutch on said sleeve to lock said sleeve with the adjacent fly-wheel and with the shaft, a lever for operating each clutch, a tumbling-rod having a pinion on each end, one of which is adapted to engage with the bevel-wheel on the shaft, the other to be moved laterally, a traction-shaft provided with a compensating gear provided with a double bevel, each of which is adapted to be engaged by the shiftable pinion, a second tumbling-rod forward of the main shaft, having a pinion on one end and a friction-wheel on the other, the pinion adapted to engage the bevel-gear on the main shaft, the friction-wheel adapted to move laterally, a threaded shaft for a steering-gear for said engine provided with two facing friction-plates, each of which is adapted to be engaged by said shiftable friction-wheel, a nut to travel on said threaded shaft, a tongue connecting said nut with the center of the front axle to adapt itself to the movement of said nut, pivoted journals for the wheels on said axle, a singletree on said tongue attached to said journals, shifting-levers for said tumbling-rods substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLS L. SCHULTZ.
ROBERT A. SCHULTZ.

Witnesses:
H. C. HUNSBERGER,
WILLIAM SEAFERT.