D. O. DE WITT.

TRACTION ENGINE.

APPLICATION FILED MAY 9, 1908.

1,002,043.

Patented Aug. 29, 1911

3 SHEETS—SHEET 1.

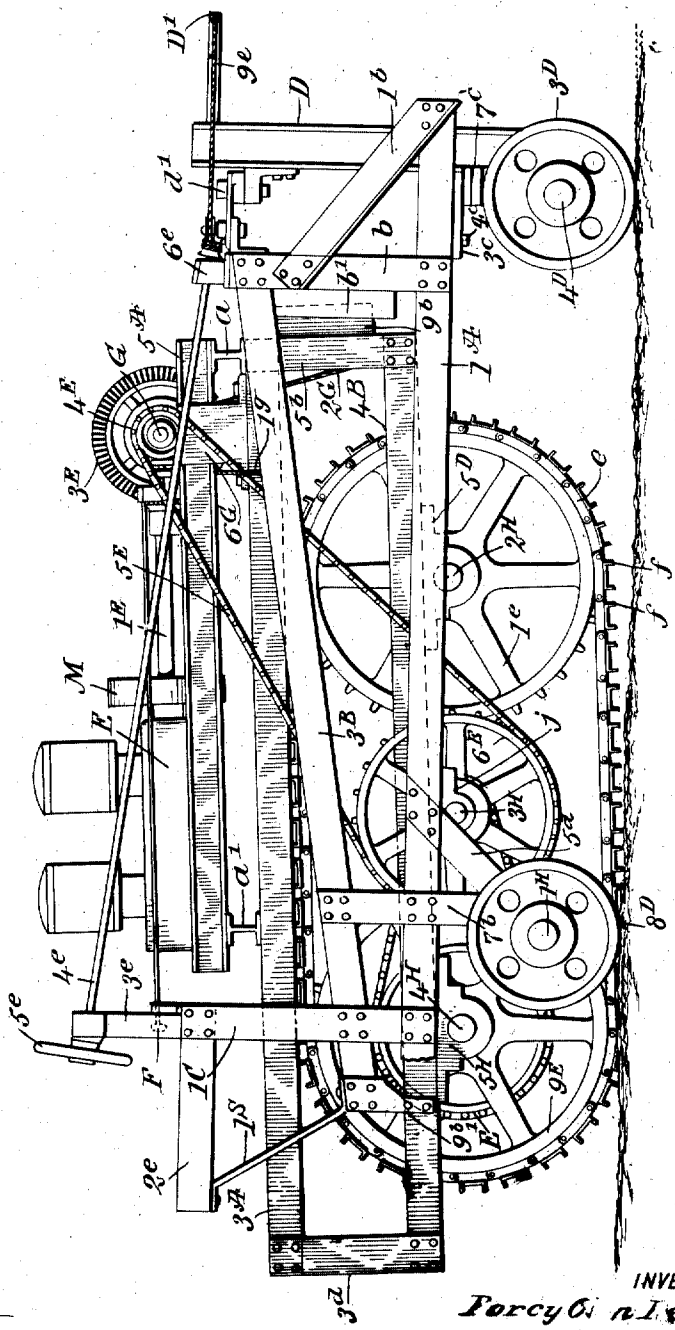

Fig. 1.

WITNESSES.

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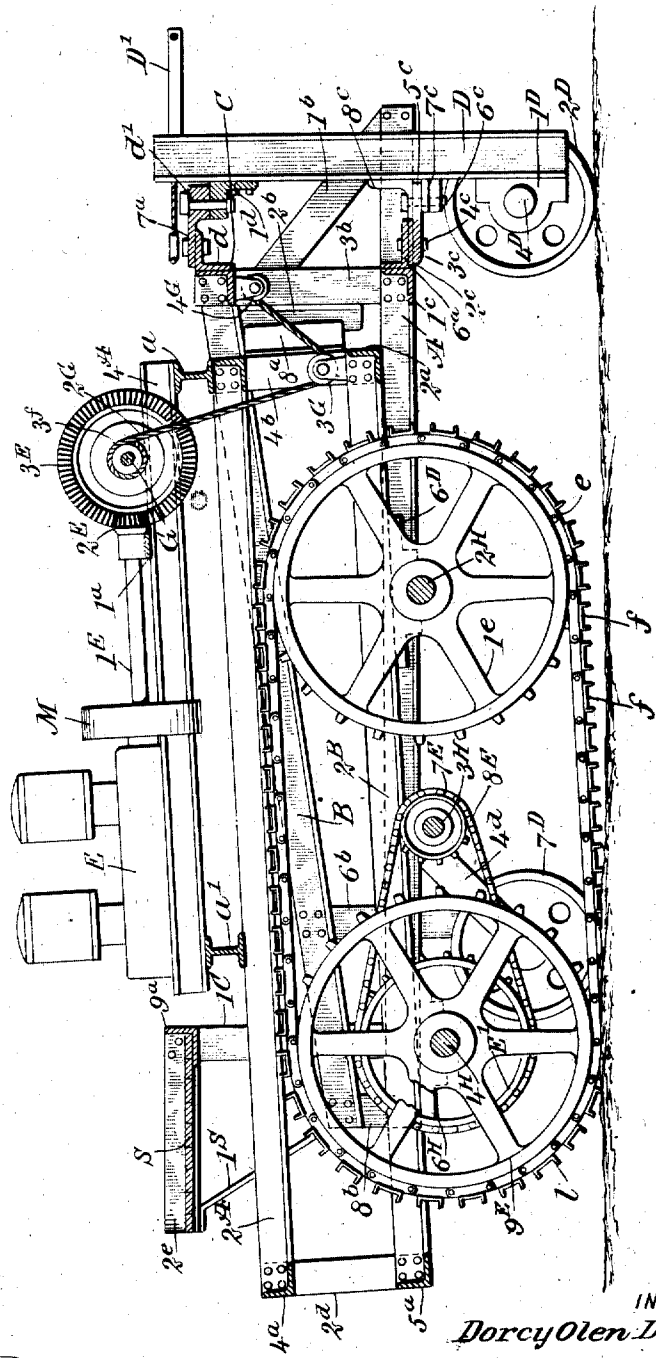

Fig. 2.

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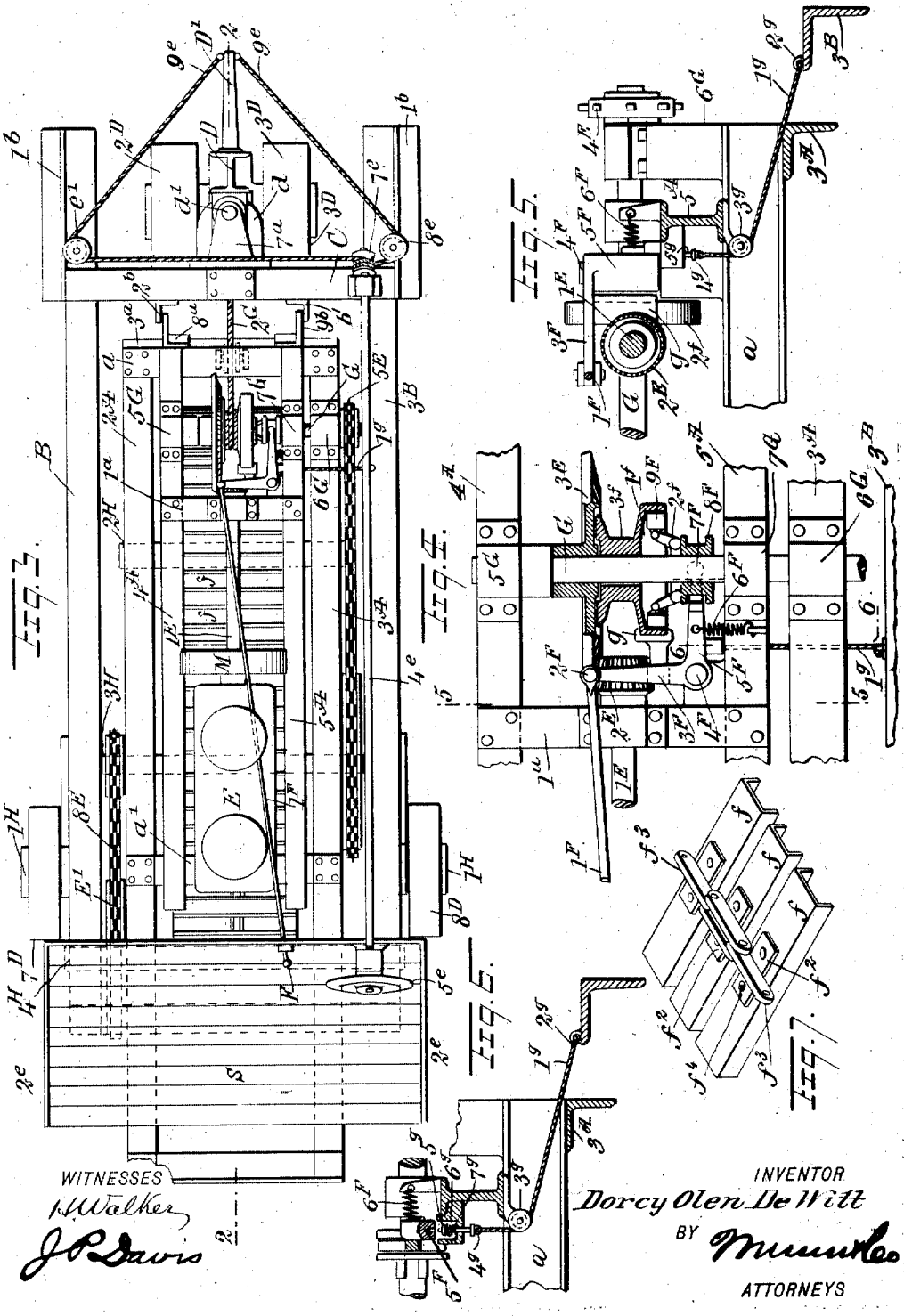

WITNESSES

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DORCY OLEN DE WITT, OF ABERDEEN, SOUTH DAKOTA.

TRACTION-ENGINE.

1,002,043. Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed May 9, 1908. Serial No. 431,790.

To all whom it may concern:

Be it known that I, DORCY OLEN DE WITT, a citizen of the United States, and a resident of Aberdeen, in the county of Brown and State of South Dakota, have invented a new and Improved Traction-Engine, of which the following is a full, clear, and exact description.

My invention relates to improvements in traction engines, in which a traction apron driven by a motor mounted upon the framework is secured to and carried by an endless sprocket chain in mesh with the driving wheels, and the objects of my improvements are, first, to provide a traction engine which may be operated with a minimum of power, especially over soft ground, consistent with the work it is performing; second, to simplify the construction of such engine by curtailing certain of the parts usually employed in the running gear; third, to provide a light and durable construction throughout and at a comparatively small cost; fourth, to render such machine capable of considerable tractive effort as compared to the weight; fifth, to provide facilities for steering and piloting the machine over uneven and soft grounds with freedom, by a single operator, and sixth, in particular to dispense with the differential gear employed in machines of the class to which my invention belongs. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view of a traction engine embodying my invention; Fig. 2 is a vertical sectional elevational view taken through the engine on the line 2—2 of Fig. 3; Fig. 3 is a top plan view of the same; Fig. 4 is an enlarged fragmentary detail plan view, of the clutch mechanism, the windlass or capstan for controlling the position of the traction apron being in section; Fig. 5 is a transverse sectional end elevational view of certain of the parts, taken on the line 5—5 of Fig. 4; Fig. 6 is a like view on the line 6—6 of Fig. 4; and Fig. 7 a detail view in perspective of a section of my improved traction apron and the propelling sprocket chains carrying the same.

In the several views similar characters of reference designate like parts.

A and 1^A refer to the side rails of the framing or sill which carries the running gear of the machine. These I prefer to construct of steel angles, and dispose them in a horizontal plane longitudinally of the machine and parallel to each other, with the legs of the angles uppermost and their tables opposing. The side rails are tied together near their forward extremities by a cross tie 1^c of similar material, which is secured at its extremities to the legs of the said angles in a well known manner by riveting. Rising at this location from the side rails A and 1^A and riveted thereto respectively, are the columns b and 3^b which are braced by bracket 1^b riveted to the terminals of the side rails A and 1^A respectively, in a familiar manner. Toward the opposite extremity of the sill and perpendicularly carried by the side rails A, and 1^A are the columns 6^b and 7^b respectively. These are riveted to their respective side rails and extend upwardly and downwardly therefrom. The lower extremities of these rails carry the balancing wheels 7^D and 8^D and the journals 1^H therefor, respectively. At the rearward, terminals of the side rails A and 1^A rise the short columns 8^b and 9^b which are respectively riveted together. To the upper extremity of the aforesaid series of columns and secured to each of the side rails A and 1^A as just described, are the oblique super side rails B and 3^B in the same vertical plane respectively with the side rails A and 1^A and tied together by the angular cross bar C. The lower extremities of the downward extending columns 6^b and 7^b and the journals 1^H, are braced respectively by the side rails A and 1^A through the braces 4^d and 5^d as will be clear by reference to Figs. 1 and 2. Columns 1^C are secured to each of the respective side rails A and 1^A and the oblique side rails B and 3^B, and rise therefrom. These are tied at their upper extremities by a cross angle 9^a, and secured at right angles thereto and extending radially therefrom are framing angles 2^e. The framing angles 2^e and the columns 1^C comprise the framing for a floor or seat S, upon which the operator or driver is stationed. The free end of the floor S is supported and braced to the sill by braces 1^s, secured at their extremities by riveting to the free ends of the framing angles 2^e and the respective rearward ends of the tables or webs of the oblique angles B and 3^B.

The horizontal side rails A and 1^A, the super oblique side rails B and 3^B, together with their ties, columns and braces just re-

ferred to, constitute the sill or framing for the running gear of my improved traction engine. The forward end of the framing or sill is carried by the steering wheels 2^D and 3^D and axle 4^D therefor. These are carried by a bracket 1^D secured to the extremity of the table of a vertical I-beam column D, which is provided with lugs 1^d, 7^e and 8^e, pivoted to brackets 6^a and 7^a, carried respectively by the cross ties C and 1^c of the framing, by king-pins or bolts d' and 6^e. To the upper extremity of the table or web of the I-beam steering column D is secured a horizontally and forwardly directed tiller D′, to which are secured the extremities 9^e of a tiller line. This is rove around the respective sheaves e' and 8^e carried by the framing at transversely opposite points in the same plane and is snubbed around a spindle bobbin 7^e carried by and secured to the steering rod 4^e. The steering rod 4^e is carried longitudinally and downwardly as well as rotationally by stanchions 3^e and 6^e rising from the floor S and the cross tie C respectively, and at its rear extremity it is secured to a hand pilot wheel 5^e. The steering rigging thus described is so connected with the pilot wheel 5^e, that upon turning the same to the right, the end 9^e of the tiller line will be pulled by the winding up of this portion of the line, upon the hub or spindle 7^e, and the other end 9^e will be relaxed by unwinding therefrom. This action will force the tiller D′ to take an angular position from that which it had previously assumed in the same plane, the effect of which will be to turn the steering column D upon its king pins d' and 6^c to the left, and carry with it the steering wheels and axle 2^D, 3^D and 4^D respectively, whereupon when the machine is advancing over the ground, it would make a turn to the left. Obviously for the same reasons, upon turning the pilot wheel to the left the machine would be steered to the right.

The various parts and frames which I have just described constitute what I shall denote the running gear or chassis of my improved traction engine.

I shall now describe the driving and traction mechanism of the machine.

Within the framing comprising the side rails A and 1^A and C, super oblique side rails B and 3^B and the vertical columns connected thereto as already described, is a second frame comprising the lower side rails 2^B and 4^B of similar material and form to those comprising the frame of the running gear. To these rails are riveted the rear columns 2^d and 3^d respectively and the head columns 4^b and 5^b respectively. The side rails 2^B and 4^B are tied together by the rear and head angle ties 5^a and 2^a respectively. Carried by the columns 2^d and 3^d and 4^b and 5^b, are the upper side rails 2^A and 3^A, secured at their respective terminals to each other by riveting in the manner already described. These several side rails and columns comprise the framing for carrying the driving gear of the machine and I shall hereinafter refer to this frame as the gear frame.

In the rear part of the gear frame is mounted an axle 4^H and the gear frame is swung at its lower side rails 4^B and 2^B to said axle, by means of the journal bearing yokes 5^H and 6^H, bolted or riveted to the under side of the said rails toward the rear thereof. The disposition of the gear frame upon the axle 4^H permits of a full oscillatory movement being given it in order that it may be readily lowered or raised as will be hereinafter more fully explained. The head end of the gear frame is guided laterally by cleats 8^a and 9^b secured respectively to the columns 4^b and 5^b, which slidingly and laterally engage the cleats 2^b and b' carried by the vertical columns b and 3^b rising from the two side rails A and 1^A of the stationary or running gear frame. Toward the forward or head end of the gear frame and secured to the under side of the side rails 2^B and 4^B, are the journal bearings and yokes 5^D and 6^D, which carry the transverse shaft 2^H, to which is keyed or otherwise secured a sprocket wheel 1^e. To the driving axle 4^H is similarly secured the main driving sprocket 9^E which in turn is driven by a reduction sprocket E′ secured to the axle 4^H. The drive of the sprocket E′ is effected through the sprocket chains and gear 8^E, reduction sprocket 7^E carried by the axle 3^H and by the yokes and journal bearings J secured to the lower sides of the side frames 2^B and 4^B. To the shaft 3^H is keyed or otherwise secured the further reduction sprocket 6^E, which is connected by a sprocket chain 5^E with a jack shaft G, driven by the motor E, as will be more fully described hereinafter.

Carried by the gear frame is a super frame of smaller dimensions than either of the two frames hereinabove described, and consists of the side frames 4^A and 5^A of an I-beam formation, carried at their terminals by the transverse I-beams a and a'. These rest upon and are secured to the upper side rails 2^A and 3^A of the gear frame. This super frame carries the motor or engine E and the jack shaft G and its coöperating parts, and I shall refer to it as the engine frame. The motor E, in the instance illustrated, represents a two-cylinder motor of the internal combustion type, and I shall occasionally throughout this specification refer to the same as a gasolene engine or motor. The gasolene motor is carried by the engine frame and secured thereto in a well known manner; as for example, the manner in which motor vehicle engines are

secured to their frames. A transverse tie 1^A and intermediate journal bearings secured to the rails 4^A and 5^A of the engine frame, carry the engine shaft 1^E, and a pillow block 6^G rising from the side rail 3^A and secured thereto, carries in a bearing a terminal of the jack shaft G, while journal bearings 5^G, 7^G on the rails 4^A and 5^A support an intermediate portion and the opposite extremity thereof respectively.

Keyed to the outer terminal or "head end" of the shaft 1^E of the gasolene motor E, is a beveled pinion 2^E, in mesh with running beveled driving gear 3^E, made fast to the jack shaft G, and is adapted to drive the same. Secured to the jack shaft G externally of the journal bearing 7^G, is a driving sprocket 4^E, which is geared to the sprocket chain 5^E and the driving train hereinbefore described.

M is the customary fly wheel clutch as employed in connection with motor vehicle gasolene engines, and is designed to cut off the power from the shaft 1^E, and connect the driving gear when desired.

Carried by the driving sprocket wheel 9^E and the idler l^2, is my traction apron, comprising the members *e* and *f*. The member *e* is a sprocket chain provided with links f^3, having integrally formed, laterally extending flanges f^2, which are centrally fastened by rivets f^4 to the members *f*. These I prefer to construct of steel channels with their edges presented to the road surface, as illustrated in Figs. 1 and 2. The said traction apron is longitudinally and centrally located between the side rails of any of the framings aforesaid, as will be observed in the plan, Fig. 3, where the members *f* appear as transverse slats, and the tractive effort of the machine is by virtue of these transverse members or channels digging into and gripping the road surface, not a question of load or weight upon the driver 9^E as customary, but a question of the necessary force in "pounds pull" upon the driving sprocket chain 8^E. When the traction apron is in the position illustrated in Figs. 2 and 3, steering of the machine is facilitated. Since the machine will be resting upon the driver 9^E and a portion of the tractor only under it, it is clear that little or no hindrance is presented to turning. With the traction apron or tractor in this position, however, the maximum of traction is not afforded since but few of the transverse channels *f* are in action.

In order to bring all of those channels which lie adjacent to the road surface into action, I lower the gear frame. The raising and lowering of the gear frame is effected through a windlass clutch and halyard guide component parts are a windlass 3f fitted for rotation to the shaft G. The windlass 3^f has an integrally formed annular housing 1^f at one end thereof, around the inner periphery of which engages an expansion-brake 9^F, or clutch, operated by toggles 2^f, collar 8^F and fork 7^F. This latter is at the terminal of one of the arms of a bell crank lever, the two arms of which are designated 3^F and 5^F, and which swing on a bearing stud 4^F carried by the framework. To the arm 3^F of the said bell crank lever is pivoted at 2^F a pull rod 1^F, which terminates in a grip or handle F. The bell crank lever is spring-retracted against the pull of the rod 1^F, by a tension spring 6^F, hooked into the arm 5^F, and connected to a fixed point on the framework in such a manner as to move the arm 5^F contrary to a pull upon the rod 1^F. The arm 3^F carries a brake-shoe *g*, which, when the bell crank lever 3^F, 5^F is under the influence of the spring 6^F, brakes the rotation of the capstan 3^f and prevents it from rotating. The collar 8^F is slidingly mounted upon the shaft G, but rotates with it, and when forced by the pull rod and fork 7^F of the bell crank lever 3^F, 5^F to expand the brake 9^F through the toggles 2^f, the arm 3^F and brake-shoe carried thereby will be moved into a position away from the housing, whereupon the capstan 3^f will be released. To effect the raising and lowering of the gear-frame and traction-apron, a halyard 2^G is made fast at one end to the stationary running gear frame by means of a snubbing pin or fastening 4^G, and is then rove under a sheave 3^G carried by the gear-frame, and thence around the capstan or windlass 3^f, where it is made fast. To lock the bell crank lever in position, a spring pressed bolt 5^g is employed and to the eye 4^g of the bolt is secured the cord 1^g, which after passing under the sheave 3^g, carried by the gear frame, is secured to the eye 2^g on the side 3^B of the main frame. The length of the cord 1^g determines the height the gear frame is raised, that is to say, when the gear frame has been raised the proper height, the bolt 5^g will be withdrawn from the arm 5^F by the cord 1^g and the elbow lever will be returned to its normal position by the spring 6^F and the clutch will be disengaged from the windlass and the brake applied. To raise the gear frame to the position shown in the drawings, the rod 1^F is pulled to operate the bell crank lever to throw the clutch 9^F into engagement with the windlass 1^f and to withdraw the shoe *g* from said windlass, whereby the windlass will be revolved and the gear frame will commence to rise. When the bell crank lever has been moved to the position described, the bolt 5^g will engage the arm 5^F and hold it in this position. The gear frame continues to rise until the cord which is drawn taut withdraws the bolt 5^g from engagement with the arm 5^F, and as soon as this takes place, the spring 6^F re-

turns the bell crank lever to its normal position, disengaging the clutch 9^F from the windlass 1^f and engaging the shoe g with said windlass when the rotation of windlass will be stopped and the frame held raised. To lower the gear frame the rod 1^F is pulled to move the bell crank lever such a distance as to disengage the shoe g from the windlass 1^f, but not far enough to engage the clutch 9^F, with the windlass or to permit the bolt 5^E to engage the arm 5^F. This movement of the bell crank lever allows the windlass to run free, whereupon the halyard 2^G will unwind from the windlass and the gear frame will fall until arrested by the idle sprocket coming in contact with the ground.

To operate my improved traction engine, the apron may be lowered as just described, which is preferable for heavy hauling, especially over soft ground or snow, and upon starting the gasolene engine in the usual manner and clutching the shaft 1^E by the clutch M, in a customary manner, the said shaft will be set into rotation for forward movement of the machine, whereupon the jack shaft G will be driven by the bevel gear and pinion 2^E and 3^E, and the sprocket 4^E will communicate this motion to the driver 6^E through the chain 5^E, which in turn will drive the sprocket E′ through the chain 8^E and connected sprocket 7^E, and finally through the driver 9^E to the traction-apron comprising the endless sprocket chain e and the transverse channels f carried thereby. The operator stationed on the platform S, in piloting the machine over the ground, when desirous of making a turn with facility, first pulls the knob F of the rod 1^F, whereupon the clutch or brake 9^F will engage the housing 1^f of the capstan or windlass 3^C and drive it, thus winding up the halyard 2^G. This will swing the gear-frame up, carrying with it the forward end of the traction-apron aforesaid, and upon releasing the pull-rod 1^F the clutch 9^F will be again disengaged and the brake-shoe g will be set against the outer periphery of the housing 1^f, to maintain the position of the gear-frame.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a traction engine, a wheel supported main frame, a pivoted gear frame in the main frame, sprocket wheels carried by the gear frame, a traction apron passing around the sprocket wheels, a motor carried by the gear frame, means for operating one of the sprocket wheels from the motor, and means operated from the motor for raising and lowering one end of the gear frame.

2. In a traction engine, a main wheel-supported frame, a driving axle, a sprocket wheel on the axle, a gear frame mounted to swing on the driving axle, a sprocket wheel in the front end of the gear frame, a traction apron passing around the sprocket wheels, a motor carried by the gear frame, means for operating the driving axle from the motor, and means operated by the motor for raising and lowering one end of the gear frame.

3. In a traction engine, a main frame, a pivoted gear frame within the main frame, sprocket wheels carried by the gear frame, means for operating one of the sprocket wheels, a traction apron passing around the sprocket wheels, a capstan mounted in the gear frame, a halyard wound upon the capstan passed around a sheave and having its end secured to the main frame, means for operating the capstan, and a clutch mechanism for said capstan.

4. In a traction engine, a main frame, a pivoted gear frame within the main frame, sprocket wheels carried by the gear frame, a traction apron passing around the sprocket wheels, means for operating one of the sprocket wheels, a capstan on the gear frame, a halyard having one end secured to the capstan and its other end to the main frame, a sheave under which the halyard passes, means for operating the capstan, a clutch and brake mechanism for the capstan, means for locking the clutch and brake mechanism.

5. In a traction engine, a wheel-supported main frame, a gear frame, a driving axle mounted in the gear frame and upon which the said gear frame swings, a sprocket wheel on the axle, a sprocket wheel in the front end of the gear frame, a traction apron passing around the said sprocket wheels, a motor carried by the gear frame, a shaft mounted in the gear frame, means for operating the said shaft from the motor, means for operating the driving axle from the shaft of the gear frame, and means operated by the motor for raising and lowering one end of the gear frame.

6. A traction engine comprising a main frame, supporting wheels at the rear of the frame, a gear frame in the main frame and pivotally mounted at its rear end, sprocket wheels carried by the gear frame, means for operating one of the sprocket wheels, a traction apron passing around the sprocket wheels, means for raising and lowering the front end of the gear frame, a pivoted wheeled steering frame at the front of the main frame, and means for operating the steering frame.

7. A traction engine, comprising a main frame, balancing wheels mounted in the frame, a driving axle, a sprocket wheel on the axle, a gear frame carrying the axle and mounted to swing thereon, a sprocket wheel in the front end of the gear frame, a traction apron passing around the sprocket wheels, means for raising and lowering one end of the gear frame, means for operating

the driving axle, a wheeled steering frame pivoted to the front of the main frame, and means for operating the steering frame.

8. In a traction engine, a main frame, a pivoted gear frame within the main frame, sprocket wheels carried by the gear frame, an apron passing around said sprocket wheels, a motor frame carried by the gear frame, a motor on the said frame, a jack shaft mounted on the motor frame and operated by the motor, means for operating one of the sprocket wheels from the jack shaft, and means for raising and lowering the gear frame from the jack shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DORCY OLEN DE WITT

Witnesses:
J. B. ROMANS,
P. H. LYONS.