A. W. SUTHERLAND.

TRACTOR.

APPLICATION FILED APR. 11, 1914.

1,142,066.

Patented June 8, 1915.

3 SHEETS—SHEET 1.

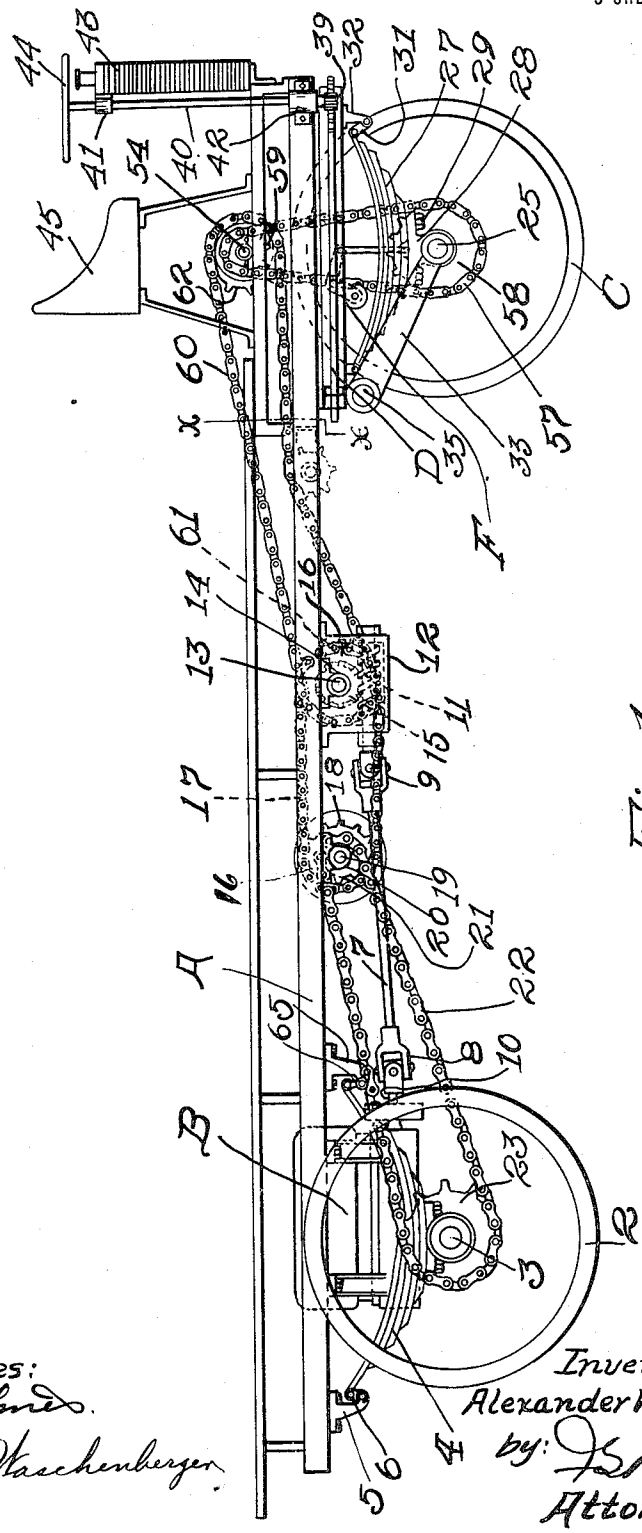


Fig. 1.

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Stella L. Waschenberger.

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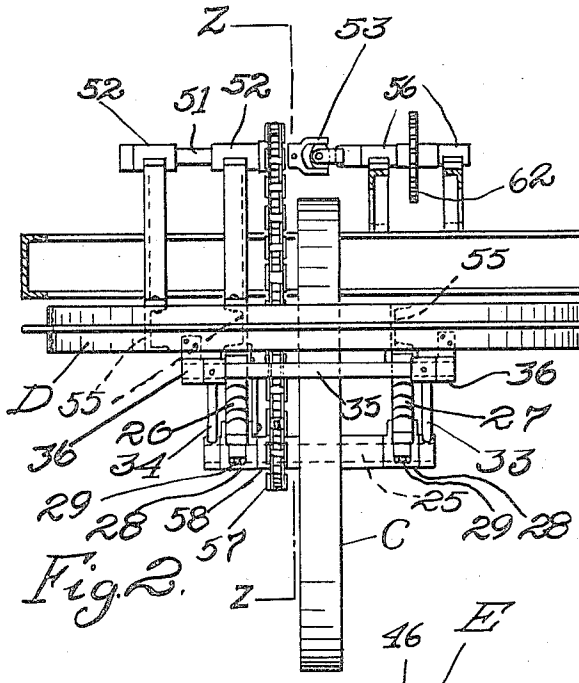


Fig. 2.

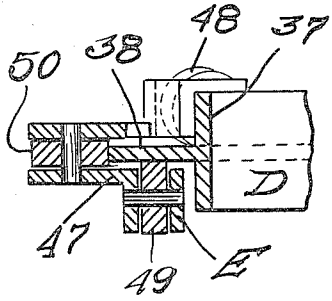


Fig. 4.

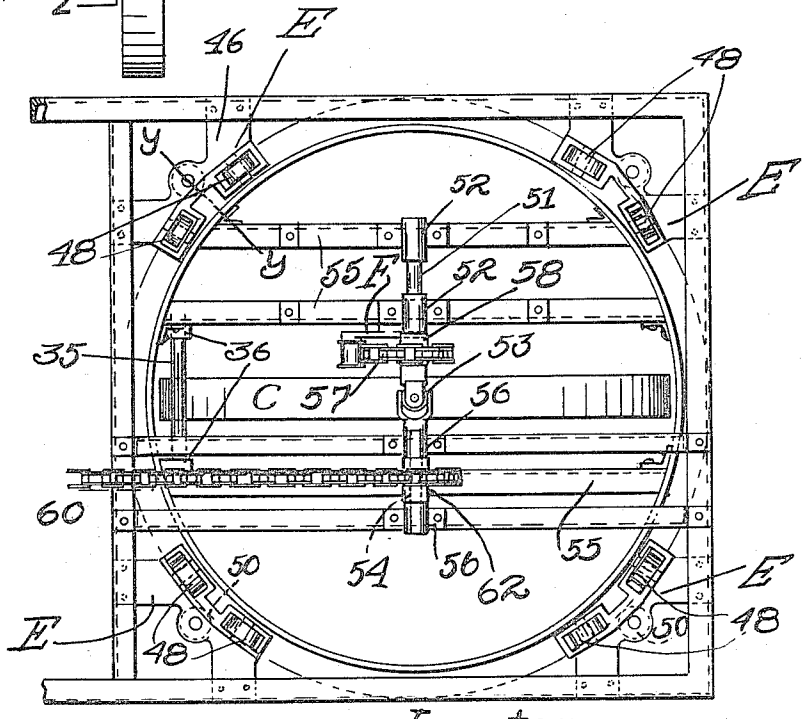


Fig. 3.

Witnesses:
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3 SHEETS—SHEET 3.

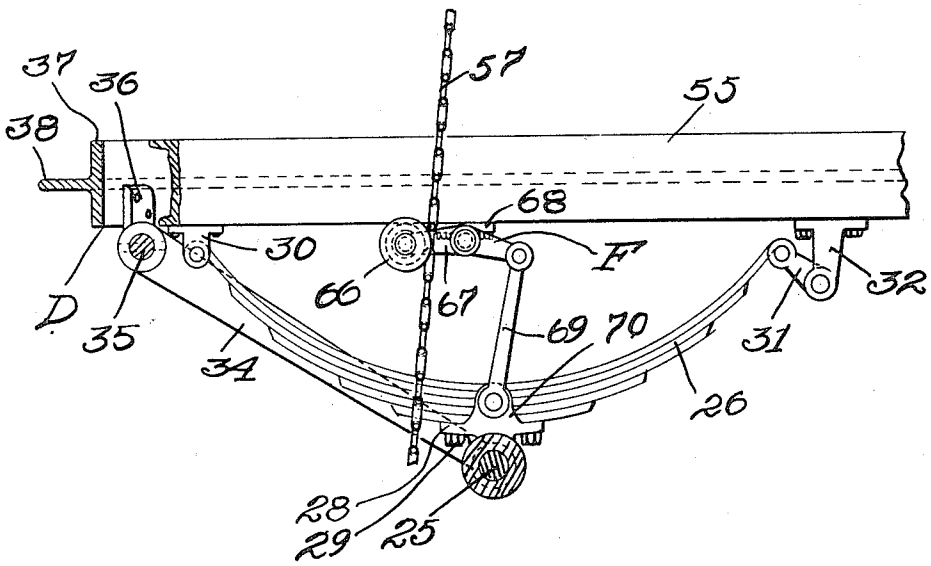


Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

ALEXANDER W. SUTHERLAND, OF ST. PAUL, MINNESOTA.

TRACTOR.

1,142,066. Specification of Letters Patent. Patented June 8, 1915.

Application filed April 11, 1914. Serial No. 831,177.

To all whom it may concern:

Be it known that I, ALEXANDER W. SUTHERLAND, a citizen of Canada, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Tractors, of which the following is a specification.

This invention relates to tractors, which are more particularly adapted for general farm utility work, such as the drawing of plows and farming implements, the carrying or drawing of loads of grain or other commodities, and for other purposes, where a light and efficient tractor is useful.

Among the primary objects of my invention are simplicity in construction and efficiency in use, together with the production of inexpensive and light weight construction.

In the accompany drawings forming part of this specification, Figure 1 is a side elevation of my invention; Fig. 2 is a section on the line X—X, of Fig. 1, the seat being removed; Fig. 3 is a plan of a detail; Fig. 4 is a section on the line Y—Y, of Fig. 3, and Fig. 5 is a section on the line Z—Z of Fig. 2.

In the drawings, A indicates a quadrangular suitably buttressed frame, having rear supporting wheels 2, mounted upon the axle or shaft 3, which is carried by the leaf springs 4, said springs being supported by brackets 5 secured to said frame and links 6 pivotally connected to said brackets and springs. The frame carries the prime mover such as gas engine B, from which leads the usual drive shaft 7 in a forward direction, said shaft being connected respectively by universal joints 8 and 9 to the crank shaft 10 of the engine, and to a screw pinion 11, which is journaled in the casing 12 on said frame. A transverse drive shaft 13 is journaled in the casing 12 and journal box 14 secured to said frame, and carries a worm gear 15, the teeth of which mesh with the teeth of the worm pinion for the purpose of assisting in transmitting power from the engine to said transverse drive shaft. The transverse drive shaft carries a sprocket 16, which is connected by a chain belt 17, passing over another sprocket 18 mounted on a counter transverse shaft 19. This counter transverse drive shaft is mounted in the journal blocks 20 on the frame, and carries drive sprockets such as 21. Chains such as 22 pass around the sprockets 21 and 23, the latter being mounted upon the rear supporting wheels 2, thus communicating motion from the main transverse drive shaft to the rear wheels when the engine is in operation.

Under the forward end of the frame, a single carrying wheel C is positioned. This wheel is adapted for steering the vehicle and is journaled upon a shaft 25, which is mounted in a pair of longitudinal leaf springs 26 and 27, suitable supporting blocks 28 being secured to the leaf springs by bolts 29 through which the shaft passes. The rearward ends of the leaf springs 26 and 27 are hinged upon the brackets 30 secured to the lower sides of cross arms 55 on the steering circle D to be hereinafter described, and the forward ends are swung by links 31 pivotally secured to the brackets 32 on said cross arms, thus compensating for the movement of the springs 26 and 27 when they are compressed. For the purpose of preventing the wheel C and its shaft 25 tilting laterally from a vertical plane, a yoke is provided having a pair of arms 33 and 34 and a body portion or shaft 35, the latter being journaled horizontally in journal blocks 36, secured to the lower surface of the steering circle D. The free ends of the arms 33 and 34 are free to swing up and down with the shaft 25, but serve to steady the shaft and hold it in horizontal position at all times irrespective of the movement of the springs 26 and 27, which carry the steering wheel C.

The steering circle D is in the form of a circular band of T iron, the cross end 37 of which stands vertically, and the body portion or bar 38 horizontally and outwardly from the circle. This bar 38 is toothed on part of its periphery and forms a rack with which a pinion 39 carried by the lower end of a steering post or shaft 40 meshes. This steering post is shown mounted in journal blocks 41, and 42, which are respectively mounted upon the frame A and the rearward side of the radiator 43, and carries upon its upper end an operating wheel 44 within easy reach of a driver on the seat 45. The circle is suitably braced and reinforced by said cross arms 55, and is mounted to turn freely concentrically between roller bearings such as E, there being four bearings illustrated equally spaced apart around the periphery of the circle. Each of these

bearings consists of a suitable frame structure 47 secured to the main frame A, and having journaled therein antifriction rollers, a pair of rollers 48 being mounted to guide the upper surface of the bar 38 of the circle, an antifriction roller 49 journaled to guide the lower surface of said bar and another antifriction roller 50, journaled to guide the periphery of said bar 38. By this means the circle is adapted to turn freely and is supported below the main frame A of the vehicle.

For the purpose of driving the steering wheel C, a shaft 51 is journaled in journal supports 52 mounted upon the cross arms 55 of the circle, one end of this shaft being connected by a universal joint 53, to the end of a driving shaft 54. The shaft 54 is journaled in journal supports 56 mounted upon the supporting arms 55, which are carried by the main frame A. The shaft 51 is operatively connected to the front steering wheel C to drive the same at substantially the same surface speed as the rear wheels are driven, by means of a chain belt 57 passing over sprockets 58 and 59 respectively mounted upon the shaft 51, and the steering wheel C. The shaft 54 receives motion to drive the steering wheel C by a chain 60 passing over sprockets 61 and 62 respectively mounted upon a shaft 54, and the driving shaft 13. The universal joint 53 compensates for the steering motion of the steering wheel. The length of the belt 57 is sufficient to permit the extreme outward movement between the steering wheel and the frame A, slack being taken up when the springs are compressed by means of a slack adjuster F. This slack adjuster is in the form of an antifriction roller 66, the periphery of which travels over the surface of the belt 57, said roller being journaled upon a lever arm 67, which is pivoted substantially midway between its ends upon a supporting block 68, carried by the supporting arm 55. The end of this lever opposite that on which the roller 66 is journaled, is pivotally connected by link 69 to a boss 70, on the bearing block 28, in which the shaft 25 is mounted. As the spring 26 is compressed or expands, the link 69 tilts the lever arm 67, causing the slack adjusting roller 66 to compensate the slack of the chain.

The frame A may obviously be of suitable form, it being buttressed and reinforced to produce the necessary strength that is necessary to withstand stresses to which a vehicle of this kind is subjected and to prevent wrenching or distortion of the operating mechanism effecting the efficiency of the device. The front steering wheel and the parts by which it is guided are adapted to permit the vehicle being easily and quickly turned and the entire apparatus is so constructed, that a maximum amount of strength is produced by a minimum amount of material. The entire apparatus may be constructed of stock materials, thus producing a very inexpensive vehicle which is particularly although by no means not exclusively adapted for farming purposes.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative, and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:—

1. A tractor, comprising, in combination, a suitable frame having supporting wheels at its rear end, and a guiding wheel at its opposite end, a circle journaled below said frame and above said guiding wheel having a toothed rack on its periphery, a pinion meshing with the teeth of said rack by which said circle is adapted to be turned for steering purposes, a pair of springs upon which said steering wheel is mounted to revolve, said springs being interposed between said circle and steering wheel to support the load of the vehicle on said steering wheel, a pair of driving arms rigidly connected and journaled upon said circle to permit their opposite ends swinging up and down in unison, said opposite ends being connected with said springs to prevent said wheel tilting from vertical position and means carried by said vehicle for revolving said steering wheel.

2. A tractor, comprising, in combination, a supporting frame, a pair of rear drive wheels adapted to be independently driven, a steering wheel below the forward end of said frame, a steering circle journaled below the forward end of said frame in a substantially horizontal plane having a toothed rack on its periphery, a pinion having teeth meshing with the teeth of said rack for steering purposes, a pair of supporting springs between said circle and said steering wheel, said steering wheel being journaled to revolve between said springs, a yoke having a body journaled upon said circle and a pair of rigidly supported arms connected to said springs, said arms being arranged to swing in unison and prevent said steering wheel tilting, a sprocket on each of said wheels, chain and sprocket mechanism connected with and arranged to revolve the sprockets on all of said wheels at the same speed, a prime mover carried by said vehicle for actuating said sprocket mechanism, and a slack adjuster for one of the belts which coöperates directly with the

sprocket on said steering wheel, said adjuster being connected with said springs and arranged to actuate said adjuster and cause it to compensate for the variation in distance between the sprockets over which said belt passes.

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

ALEXANDER W. SUTHERLAND.

Witnesses:
CLARENCE W. HALLERT,
STELLA L. WASCHENBERGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."