V. R. HANSON.

TRACTOR.

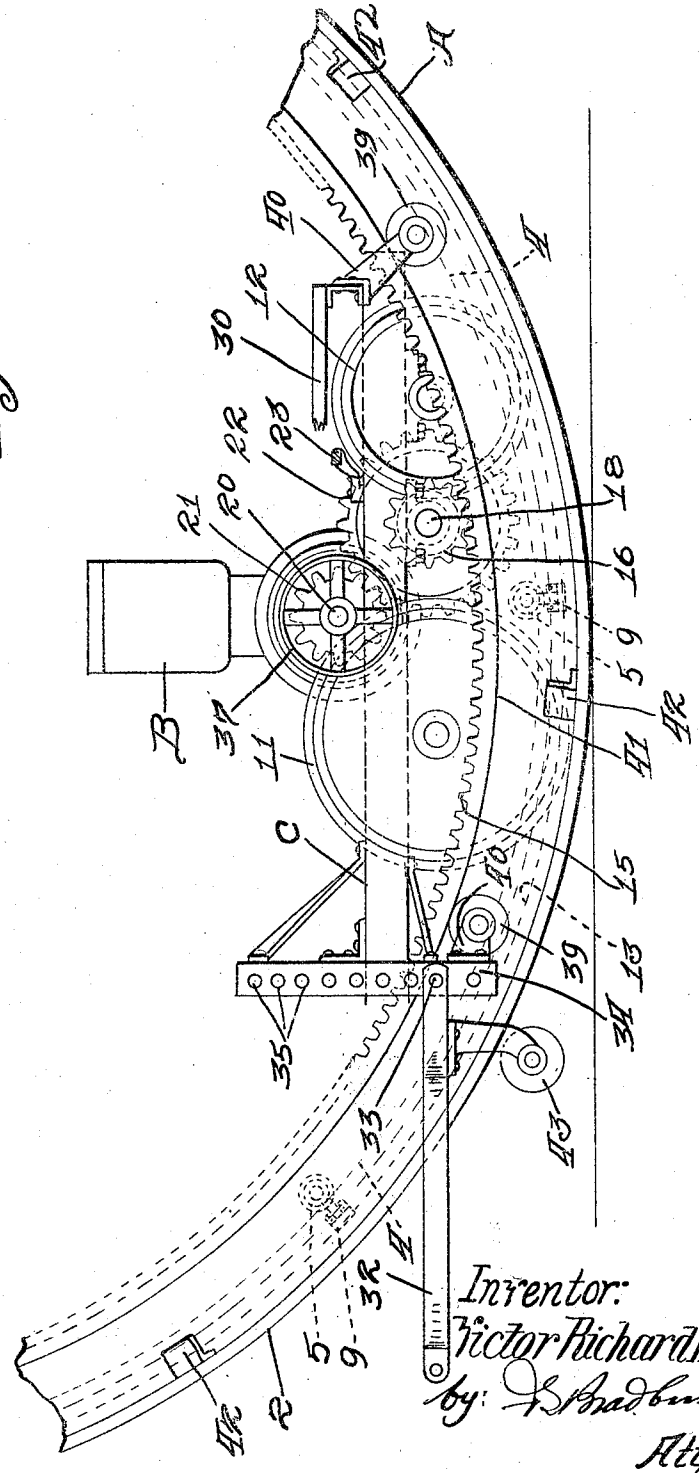
APPLICATION FILED AUG. 30, 1915.

1,299,178.

Patented Apr. 1, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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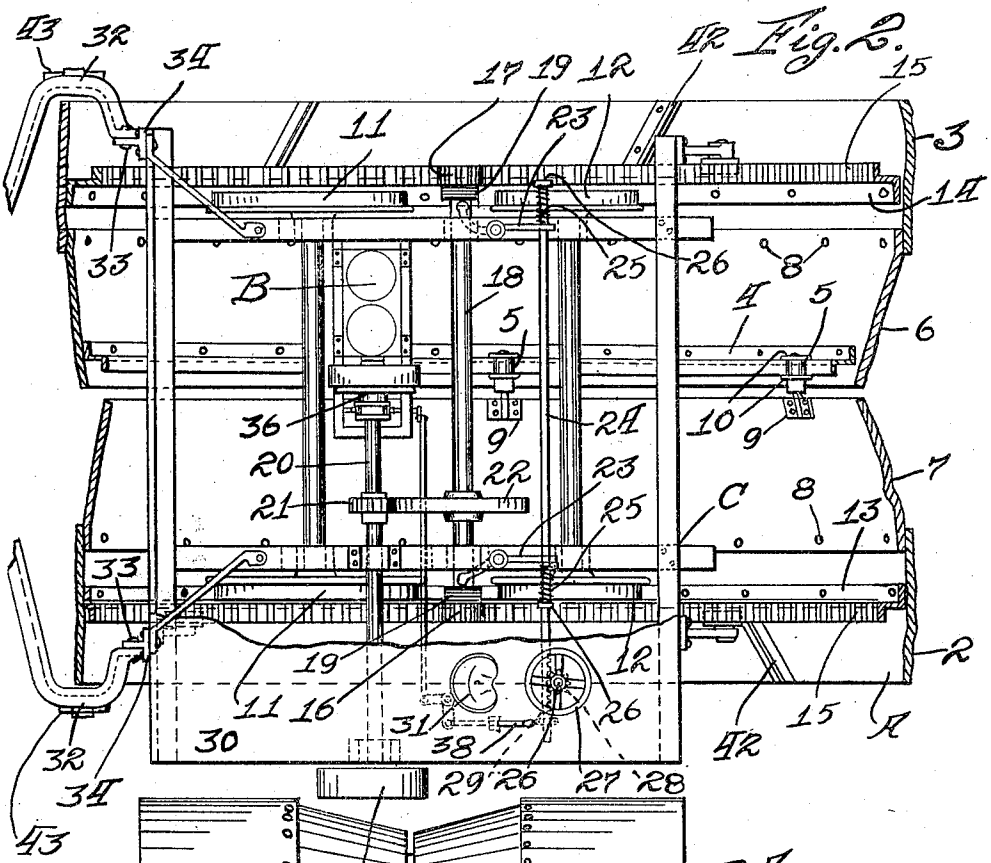


Fig. 2.

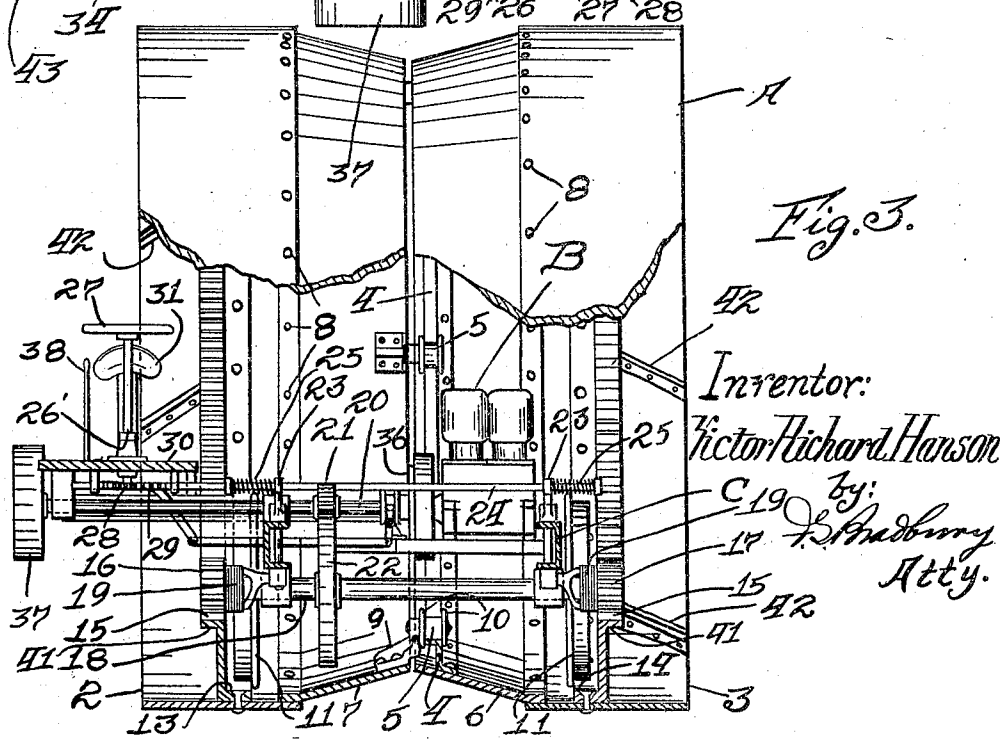


Fig. 3.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

VICTOR RICHARD HANSON, OF MINNEAPOLIS, MINNESOTA.

TRACTOR.

1,299,178. Specification of Letters Patent. Patented Apr. 1, 1919.

Application filed August 30, 1915. Serial No. 47,994.

To all whom it may concern:

Be it known that I, VICTOR RICHARD HANSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and useful Improvement in Tractors, of which the following is a specification.

My invention relates to improvements in tractors and has among its objects the following: low cost of production, simplicity of construction and greater effectiveness in use than heretofore. With my improvement a great initial power is available at all times for overcoming large obstructions and the application of driving force and distribution of the weight of the parts places the center of gravity low down near the longitudinal line of draft of the vehicle making the vehicle difficult to tip over and powerful in pulling capacity. The prime mover is applied at a point closest to the work resulting in the use of a minimum amount of transmission mechanism and in little or no loss of power between the prime mover and the ground over which the vehicle travels. The construction also obviates the use of differential gearing which is a distinct advantage. In effect the roller element which I employ acts as a broad endless track which is laid automatically over the surface of the ground and upon which the prime mover travels and applies a maximum pulling force for the load. Thus the tractor is adapted for effective use on soft ground as well as upon hard and smoothly finished roads.

In the accompanying drawings forming part of this specification, Figure 1 is a side elevation of a detail of my invention, a portion of the roller element being broken away; Fig. 2 is a plan of the construction illustrated in Fig. 1, and Fig. 3 is a front view, part of the structure being broken away and in section.

In the drawings, A indicates a roller element which is adapted to roll upon the ground and form a continuous track upon which the prime mover B travels. The roller element consists of two broad faced bands or rims 2 and 3 of substantially the same diameter situated side by side and coaxially arranged to revolve freely of each other and being joined together by a circular guide rail 4 and a plurality of anti-friction wheels 5. The adjacent edges of the bands 2 and 3 are provided with a pair of inwardly slanting flanges 6 and 7 secured by rivets 8 or other suitable means to the rims and upon the immediately adjacent portions of said flanges are mounted the guide rail 4 and brackets 9 revolubly carrying the antifriction wheels 5. Thus the rims are swiveled together and may revolve freely of each other, but are held laterally together, the flanges 10 on the wheels 5 overlapping the sides of the track 4. Located within the roller element is a carriage C in the form of a horizontal frame having pairs of carrier wheels 11 and 12 on each side which ride upon circular guides 13 and 14 secured to the inner faces of the rims, the guide 13 being carried by rim 2 and the guide 14 by rim 3. These guides are parallel and revolve coaxially. The inner surfaces of the guides are formed with gear teeth 15 with which the teeth of pinions 16 and 17 mesh, said pinions being journaled freely upon the opposite ends of a drive shaft 18, which is journaled across the carriage. There is a clutch 19 interposed between the carriage frame and each of said pinions, the operation of said clutches being adapted either to drive both rims simultaneously or to drive one rim independent of the other, whereby a differential movement occurs between said rims when it is desired to steer the roller around a curve or corner.

The prime mover B may be an internal combustion engine, such as shown or any other power element, said engine being illustrated with the usual crank shaft 20 and rigidly mounted upon the carriage. Power is transmitted from the crank shaft to said drive shaft by intermeshing pinion 21 and gear 22. Thus power is applied by the engine directly to that portion of the roller immediately over the work to be performed. The steering of the vehicle is accomplished by manipulating the clutches 19, releasing either thereof causing power to be transmitted to one only of the rims and revolving the driven rim about the bearing portion of the opposite rim as a pivot. To operate the clutches there is a bell crank clutch shifting lever 23 provided for each clutch pivoted upon the carriage frame, one arm of said lever being pivotally attached to the driving element of one of the clutches 19 and the other arm being slidably engaged with a shift bar 24, which is slidable across the carriage frame. This shift bar holds the clutch levers with their connected driving clutch elements urged in releasable clutch

engaged position by means of coil springs 25, said springs pressing against heads 26 on the ends of said bar and against the levers 23. To shift the bar 24 a standard 26′ is journaled on the carriage frame, said standard carrying a hand operable steering wheel 27 on its upper end and a pinion 28 on its lower end, the teeth of the latter meshing with rack teeth 29 on said bar 24. Thus when the bar is moved in either direction longitudinally from median position in which both clutches are engaged, one of the clutches is disengaged against the tension of one of the springs 25, while the other clutch remains engaged due to the force urged by the remaining spring 25 against the companion clutch shifting lever.

The carriage frame C is formed with a side extension carrying a platform 30 upon which a seat 31 is mounted convenient to the steering wheel for the operator. Any suitable controlling mechanism (not shown) may be provided for the engine or any suitable reverse and speed change mechanism interposed in the driving means, such devices being in common use.

To couple the vehicle to a load to be drawn, a draw bar 32 in the form of a yoke is provided, the ends of the arms of said yoke being each provided with a coupling pin 33 which may be pivotally engaged with a clevis 34 at each side of the rear portion of the carriage frame in any one of a vertical series of openings 35. When desired a belt pulley 37 may be mounted on the outer end of shaft 20 by which power may be utilized from the engine for driving any farm implement or device. A main clutch 36 is also interposed in shaft 20 operable by a hand lever 38 by which the driving mechanism may be connected with or disconnected from the engine or prime mover. Flights 42 slanting endwise on the inner surfaces of the bands 2 and 3 act as guides to eject earth and stone from within and roller shoes 43 on the side arms of the draw-bar 32 prevent the carriage from riding too high on the guides 13 by pressing downwardly upon the surface of the ground in case the bands meet with an obstruction.

Operation.

The engine revolving the crank shaft imparts motion to the pinions which in turn transmit motion via the racks to the track members so that such members are operated together or independently of one another through the operation of the differential clutch members. In view of the fact that the prime mover is placed, and consequently the power directed, directly over and in juxtaposition to the point of contact of the tracks with the ground an advantage results in that there is substantially no loss of power and maximum traction is attained. The throwing in and cutting out of the main clutch controls the movement of the tractor, while the manipulation of the differential clutches controls the steering. To couple a load to the tractor, the draw bar is employed and should an obstruction tend to impede progress of the track members, guide rollers 39 journaled upon brackets 40 attached to the carriage frame C and rolling against circular shoulders 41 on the guides 13 and 14, prevent the carriage and the parts mounted thereon becoming displaced.

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 prime mover, a rotatable drum in two cylindrical sections adjoining their ends having inwardly extending broad faced clearance flanges revolubly joined endwise together, said cylindrical portions providing tread surfaces at the ends of said structure upon the surface of ground and driven independently by said prime mover, whereby one of said sections may be caused to revolve about the bearing point of the other section on the ground, and an endless guide secured to and concentric with one of said sections having a shouldered outer surface and driving means engaging said inner surface for revolving said guide and engaging said shouldered inner surface to prevent the detachment of said driving means from said guide.

2. A tractor, comprising, in combination, rotatable drum elements independently journaled together by their peripheries and adapted to roll upon the ground, an endless guide secured in the rim of one of said drum elements having a toothed inner surface and a shouldered outer surface, a carriage having a wheel riding upon said guide and a guide roller engaging freely below the shoulder on said guide to prevent the detachment of said carriage from said guide and a prime mover on said carriage having a driving gear the teeth of which mesh with the teeth of said guide.

3. A tractor, comprising, in combination, a plurality of cylindrical drums having broad faced inwardly tapering flanges, said flanges having their adjacent ends movably joined by antifriction bearings, each of said cylindrical drums having rolling contact

with the surface of the ground, an endless guide mounted within said drums and concentric therewith, a carriage movably mounted upon said guide, a prime mover upon said carriage having actuating connection with said drums for propelling the latter and means carried by said carriage and engaging freely below said guides for holding said carriage against detachment from said guides.

4. A tractor, comprising, in combination, a plurality of cylindrical drums concentrically arranged, a pair of clearance elements carried between said drums and having adjacent ends swiveled together, spaced parallel guides mounted within said drums and concentric therewith, a carriage movably mounted upon said guides, a prime mover upon said carriage having driving connection with said drums for propelling the latter, means for coupling said carriage with a load, and guide rollers carried by said carriage and engaging freely below said guides to prevent detachment of said carriage from said guides under the pulling action of the carriage upon a load.

5. A tractor, comprising, in combination, a plurality of endless broad faced rims concentrically arranged and independently journaled, said rims having rolling contact with the surface of the ground and being formed with inwardly tapering broad faced adjacent flanges to permit the rims turning freely in a curve, an endless guide carried concentrically within said rims having an endless toothed rack, a carriage movably mounted upon said guide in close proximity to the point of contact between said rims and the surface of the ground, and guide rollers carried by said carriage and engaging freely below said guides to prevent detachment of said carriage from said guides under the pulling action of the carriage upon a load and a prime mover upon said carriage having a gear actuating connection with said rack for the purposes specified.

6. A tractor, comprising, in combination, a rotatable endless drum track in two sections journaled to rotate independently upon the surface of the ground and formed with a broad faced clearance passage between said sections to permit said sections turning freely when moving in a curve, the adjacent ends of said sections being swiveled together by antifriction bearings, an endless guide carried concentrically within each of said sections, a prime mover riding upon the guides having an independent actuating connection with each of said guides, means for coupling a load to said prime mover, and guide rollers carried by said carriage and engaging freely below said guides to prevent detachment of said carriage from said guides under the pulling action of the carriage upon a load.

7. A tractor, comprising, in combination, rotatable endless drum elements independently journaled and adapted to roll upon the ground, said drum elements having adjacent broad faced inwardly tapering clearance flanges swiveled by their adjacent ends together, an endless guide secured within said tracks, a prime mover riding upon said guide in juxtaposition to the point of contact of said tracks with the ground, an operating connection between said prime mover on said tracks, and a guide roller engaging freely below said guide to hold the prime mover against detachment from said guide under the pulling action of said prime mover upon a load.

8. A tractor, comprising, in combination, rotatable endless drum elements independently journaled and adapted to roll upon the ground, said drum elements being swiveled endwise together, a prime mover riding within and having driving connection for revolving said drum elements, and earth and stone ejectors secured to the inner surfaces of said drum elements, said ejectors having outwardly slanting surfaces adapted to remove earth and stones from within said drum elements as the drum elements revolve.

In testimony whereof I have signed my name to this specification.

VICTOR RICHARD HANSON.

Witnesses:

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F. G. Bradbury.

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