H. I. WASHBURN

TRACTION DEVICE.

APPLICATION FILED DEC. 19, 1918.

**1,325,220.**

Patented Dec. 16, 1919.

3 SHEETS—SHEET 1.

FIG. I.

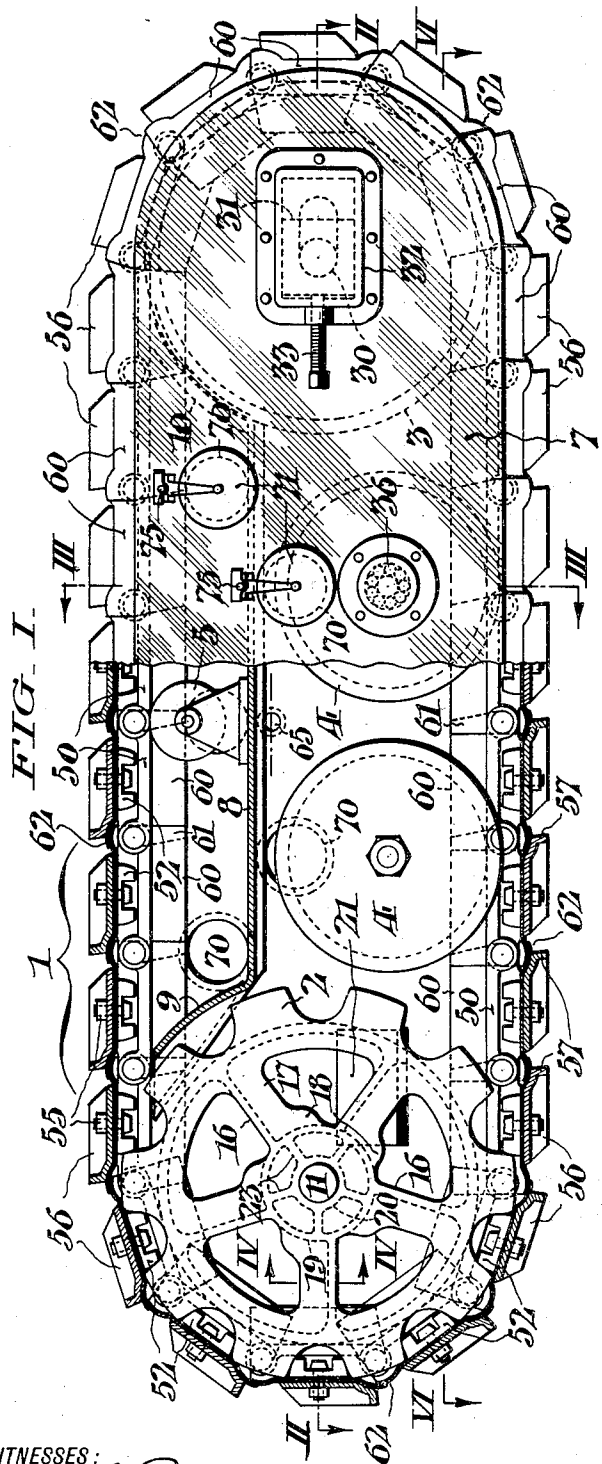
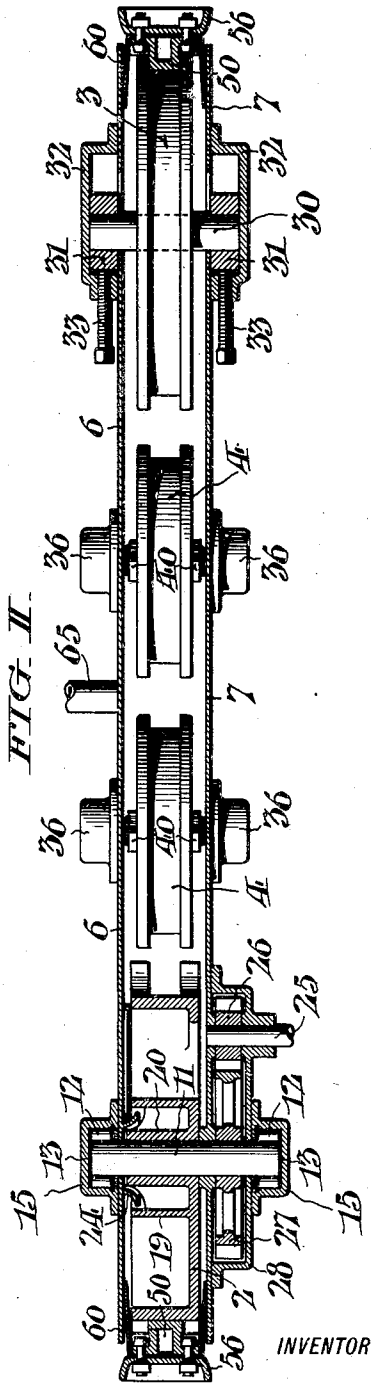


FIG. II.



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3 SHEETS—SHEET 2.

FIG. III.

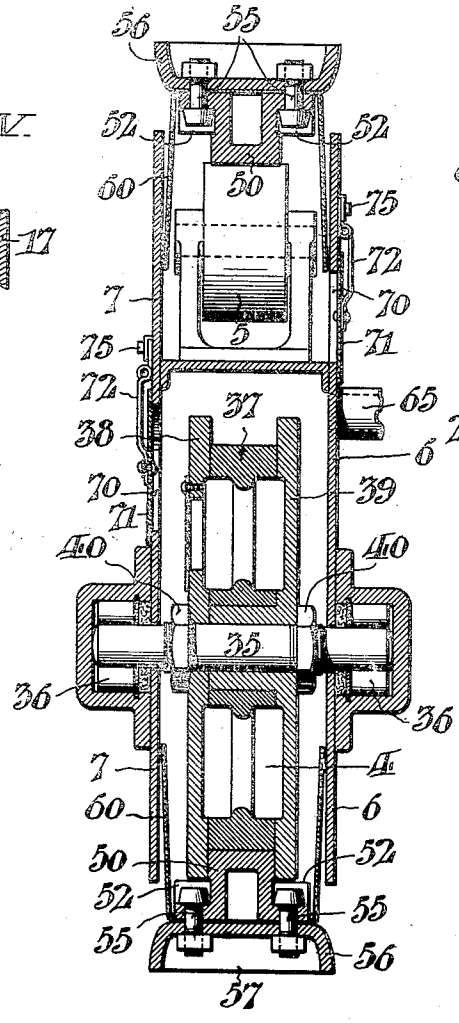



FIG. IV.

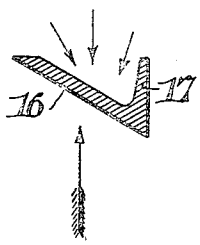



FIG. V.

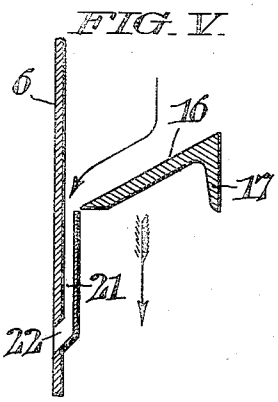
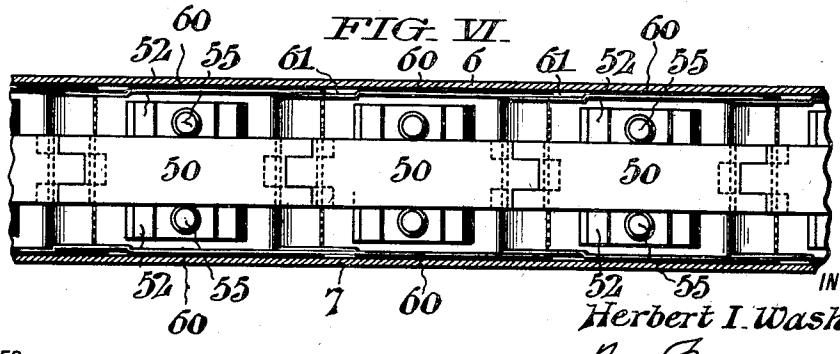



FIG. VI.




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3 SHEETS—SHEET 3.

FIG. VII.

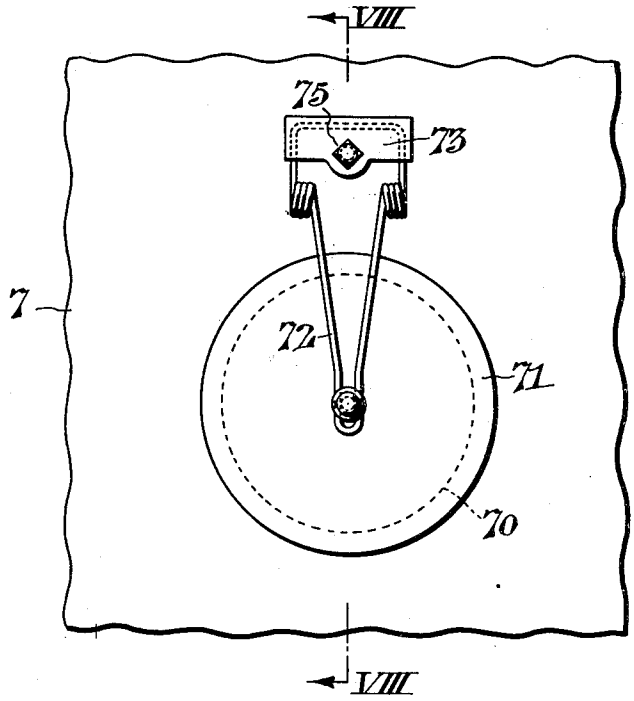



FIG. VIII.

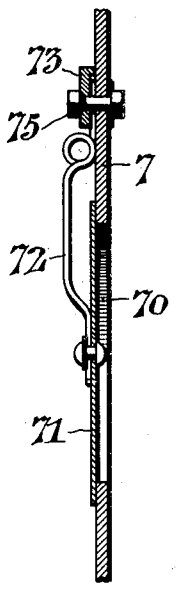
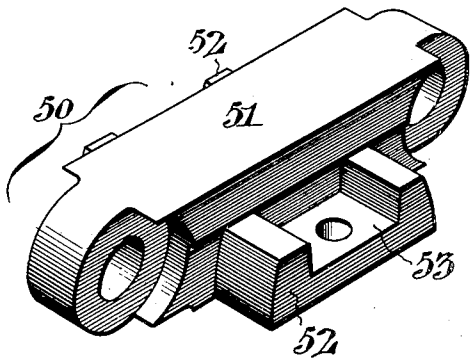



FIG. IX.




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# UNITED STATES PATENT OFFICE.

HERBERT I. WASHBURN, OF LAUREL SPRINGS, NEW JERSEY.

## TRACTION DEVICE.

1,325,220. Specification of Letters Patent. Patented Dec. 16, 1919.

Application filed December 19, 1918. Serial No. 267,438.

*To all whom it may concern:*

Be it known that I, HERBERT I. WASHBURN, of Laurel Springs, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Traction Devices, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to traction devices for agricultural tractors or similar structures.

The invention is more particularly directed to the "crawler" type of such devices wherein locomotion is effected by an endless track chain traveling in contact with the ground.

An organization of the above type is constituted of a comparatively large number of moving parts which are ordinarily directly exposed to the action of sand or grit under the rough usage for which the tractors are designed. As a consequence of such exposure, the sand or grit causes excessive wear thereby greatly reducing the efficiency of the device.

In order to overcome these difficulties, the tractor drive constructed according to my invention includes an endless chain running within a housing partly formed by side walls between which the various driving and supporting elements are located and which is otherwise completed by a series of overlapping sheath units carried by the chain and functional in serving as a perimetrical covering for the structure.

Influx of dirt or grit is further prevented by pressure exerted from the interior of the casing supplied from an ulterior source such as the exhaust from an internal combustion engine or an air compressor, the pressure medium dissipating through interstices between the various moving parts.

The device constructed according to my invention also provides for the collection and partial ejection of any sand or grit dropping to the interior from the upper run of the chain.

The invention further comprehends other novel adjunctive features which will become apparent by reference to the accompanying drawings in which—

Figure I is a view partly in side elevation and partly in vertical section, of a traction device conveniently illustrating my invention.

Fig. II is a horizontal plan sectional view of the same taken on line II—II, in Fig. I.

Fig. III is a vertical cross sectional view on the line III—III of Fig. I.

Fig. IV is a detail section along the line IV—IV in Fig. I illustrating the construction of the pocketed spokes of the driving sprocket or the tractor chain.

Fig. V is a view similar to Fig. IV showing in addition the position of a spoke with relation to the discharge chute.

Fig. VI is a detail plan view on the line VI—VI of Fig. I.

Figs. VII and VIII illustrate in detail one of the explosion doors or covers for the tractor housing and

Fig. IX is a perspective view of one of the chain links.

The traction device as herein illustrated consists of an endless track chain comprehensively indicated at 1, and confined to movement in a circuit determined by a driving sprocket wheel 2, at one end of the structure and idler drum 3, at the other end; its ground run intermediate the sprocket and drum being buttressed by smaller idlers 4—4, and upper or return run supported against sagging, by a roller 5. These elements are inclosed within a housing formed in part by a pair of spaced side walls 6 and 7, extending substantially the full length of the structure. Said side walls are spaced and rigidly united by a horizontal diaphragm 8, whose ends are curved upwardly as at 9 and 10 in concentricity with the axes of the sprocket and drum. The trough thus formed is substantially or approximately co-extensive with the upper return run of the chain, and receives and collects dust or sand dropping from the upper run of the chain.

The shaft 11, or driving sprocket 2 is journaled in roller bearings 12—12, and its ends are rounded as at 13 for engagement with the inner faces of the bearings caps 15, to resist lateral thrust of the sprocket. The spokes 16, of the latter are V-shaped in cross section as shown in Fig. IV, and the pockets formed by this construction, serve to receive the excess dirt or sand dropping from the chain, as the latter turns about the sprocket in approaching its upper run. The inner ends of the spokes radiate from a flange ring 19, concentric with the hub 20, of the sprocket. The spoke webs 17, lying

in a plane coincident with that of the sprocket face, are supplemented at their inner ends by extensions 18, which merge into the outer face of the flange ring 19, as best shown in Fig. I. The dust collected during the upward motion of each spoke as designated by the large arrow in Fig. IV, is subsequently dumped, during the reversal of motion, toward the central flange ring 19, and thereafter deflected sidewise through the assistance of the spoke web extensions 18. The dust or dirt thus liberated is, in each instance, through the further assistance of the sloping back of the preceding spoke, directed to a discharge chute 21, leading to the exterior of the structure through an egress opening 22 in the side wall 6.

The flange ring and the hub of the sprocket are united by a series of radial webs 23, and into the interspace between them, projects an annular flared guard 24, integrally formed with the side wall 6, and functional in protecting the roller bearing 12, against the entrance of dirt or grit.

The device is driven by a power shaft 25, upon which is fixed a gear pinion 26, the latter meshing with a gear 27, mounted upon the sprocket shaft 11. These gears are inclosed within a suitable protective casing 28, bolted to the side wall 7.

The supporting drum 3, rotates about an axle 30, whose ends are fixed within slide blocks 31, guided for adjustment to take up the chain slack, in journaled boxes 32, also bolted to the side walls 6 and 7. The adjustment is varied by means of the set screws 33.

As shown in Fig. III, the shafts 35, of the idlers are journaled in roller bearings 36, and provided with rounded ends functional in a manner analogous to that described in connection with the journal mountings of the driving sprocket. Each of the idlers consists of an independently rotatable central member 37, frictionally retained between the side disks 38 and 39, clamped on the shaft by the jam nuts 40. The disks are of a larger diameter than the intermediate member 37, so as to provide a channel for the reception and guidance of the chain links. Wear is reduced to a great extent by this construction, since the flanges and the supporting face are thereby permitted to rotate at different rates under the induced propulsion of the chain. The interior of the idler is filled with a solidified lubricant such as graphite, access being afforded through a protected opening 41 in the disk 38. The interior of the supporting drum 3, is preferably constructed in a manner similar to the idlers 4, so that the flange and chain may be constantly supplied with a certain amount of lubricant from the interior of these elements by excretion effected through their movement.

The driving chain 1, is composed of a series of pivoted links 50 such as illustrated in Fig. IX. Each link is formed with a comparatively broad inner track face 51, upon which run the central peripheral surfaces of the driving sprocket and idlers. At each side, the link is provided, intermediate its pivotal ends, with an integral tooth member 52, having a configuration curved in opposition to the teeth of the sprocket. These tooth extensions are of less height than the link proper, so that in assemblage, a continuous ridge or track is formed by the faces 51 as shown in Fig. VI. This ridge is engaged at its sides by the peripheral flanges of the idlers and thereby sustained against lateral motion during traction. A recess 53 is formed in each of the said tooth members of the chain link, to provide space for the heads of bolts 55, by which the replaceable ground engaging shoes 56 are secured. As shown in Fig. III these shoes are of a dished cross section, and provided (Fig. I) at one end with lateral webs 57, so as to more effectively engage the ground.

Each link is further supplemented by a U shaped inwardly turned sheet metal sheath unit 60, which envelops the exposed portion of the link and is also secured by the bolts 55, being clamped beneath the shoe 56. The sides of the adjacent sheath units 60 (Figs. I and VI) overlap and are offset as at 61 in complementary serial relation at the region of link pivots to permit relative angular displacement in rounding the sprocket or idler drum. Said units are also provided with complementary nested edges which are curved in concentricity with the link axes as shown at 62 in Fig. I. It is to be noted from the drawings that the sides of the units 60 extend inwardly to a considerable extent between the walls 6 and 7 and the series serves as a perimetrical covering and prevents the entry of dust to the interior of the housing co-jointly formed by the said walls.

In order to further guard against the entry of dust or sand, the housing may be connected through a tube 65, with the exhaust of an internal combustion engine or a source of compressed air. The scavenging medium under pressure thus introduced is dissipated about the circuit of the chain and escapes through the clearance space between the sides of the sheath units 60, and the inner faces of the walls 6 and 7.

Access to the interior of the structure for the purposes of cleaning or lubricating is afforded through a series of openings, 70. Each of these openings, as shown in detail in Figs. VII and VIII is protected by a cover disk 71, normally held in place by a spring arm 72, so as to be capable of yielding in the event of explosions of any unspent gases entering the housing. The spring arms 72

are secured to swivel members 73, pivotally attached by bolts 75, to the side walls 6 and 7. By this construction the covers may be turned aside about the swivel axes of bolts to expose the openings.

It is to be understood that I do not wish to limit myself to the precise application herein described since my invention may be readily employed for other similar purposes, and further that various changes may be made in construction and arrangement without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A tractor device comprising an endless track chain; supporting and driving devices therefor; and an inclosure for said devices constituted co-jointly by a series of sheath units carried by said chain, and coöperative stationary housing walls overlapping said units.

2. A tractor device comprising an endless track chain; supporting and driving devices therefor; and an inclosure for said devices constituted by a series of inwardly turned sheath units carried by said chain and running between stationary housing walls, overlapping said units.

3. A tractor device comprising an endless track chain; supporting and driving devices therefor; and an inclosure for said devices constituted by a series of sheath units having a U-shaped cross section enveloping the exposed portions of the said chain, and stationary housing walls overlapping the sides of the sheath units.

4. A tractor device comprising an endless track chain; supporting and driving devices therefor; inwardly turned sheath units of U-cross section enveloping the exposed portions of the chain, said units overlapping each other at the sides and also at the region of the pivotal axes of the chain links; and a pair of stationary housing walls overlapping the inturned sides of the sheath units.

5. A traction device including in combination an endless track chain; supporting and driving devices for the said chain; a housing for the said driving devices; and a dust collecting trough located within said housing directly beneath and substantially co-extensive with the upper return run of said chain.

6. A traction device including in combination, an endless chain; a housing for the said chain; a driving sprocket for said chain, said sprocket having pocketed dust collecting spokes; and a discharge chute adapted to coöperate with the pocketed sprocket spokes in deflecting the dust to the exterior of the housing.

7. A traction device including in combination, an endless track chain; driving and supporting devices for the said chain; a substantially closed housing for the said driving and supporting devices; means for delivering a scavenging medium under pressure to the interior of said housing, so that the dissipation of said medium from the housing through the interstices of the movable parts prevents the influx of dust into the housing.

8. A traction device including in combination, an endless chain; driving and supporting devices for the said chain; a housing for the said driving and supporting devices; means for delivering the exhaust from an internal combustion engine to the interior of said housing whereby the dissipation of exhaust gases through the interstices of the movable parts prevents the influx of dust; and spring pressed protective doors for the said casing.

9. A traction device including in combination, an endless chain; a housing for said chain; a driving sprocket for said chain, said sprocket having spokes of angular cross section radiating from a central concentric flange ring forming, conjunctively, a series of dust collecting pockets; and a chute coöperative with the sprocket spokes in deflecting the dust to the exterior of the housing.

10. A traction device including in combination, an endless chain; a housing for said chain; a driving sprocket for said chain, said sprocket having spokes of angular cross section radiating from a central concentric flange ring forming, conjunctively, a series of dust collecting pockets; a chute coöperative with the sprocket spokes in deflecting the dust to the exterior of the housing; and an annular flared guard projecting within the flange ring of the sprocket, whereby the sprocket bearing is protected against the entry of dust.

11. A traction device including in combination, an endless chain; a housing for said chain; a driving sprocket for said chain, said sprocket having spokes of acute angular cross section radiating from a central concentric flange ring forming conjunctively a series of dust collecting pockets; and a discharge chute so located that, as the spokes move angularly from the vertical toward the horizontal, the dust is dumped from the pocket of one spoke on to the sloping back of the preceding spoke, and by the latter deflected to the discharge chute.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this 12th day of December 1918.

HERBERT I. WASHBURN.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.