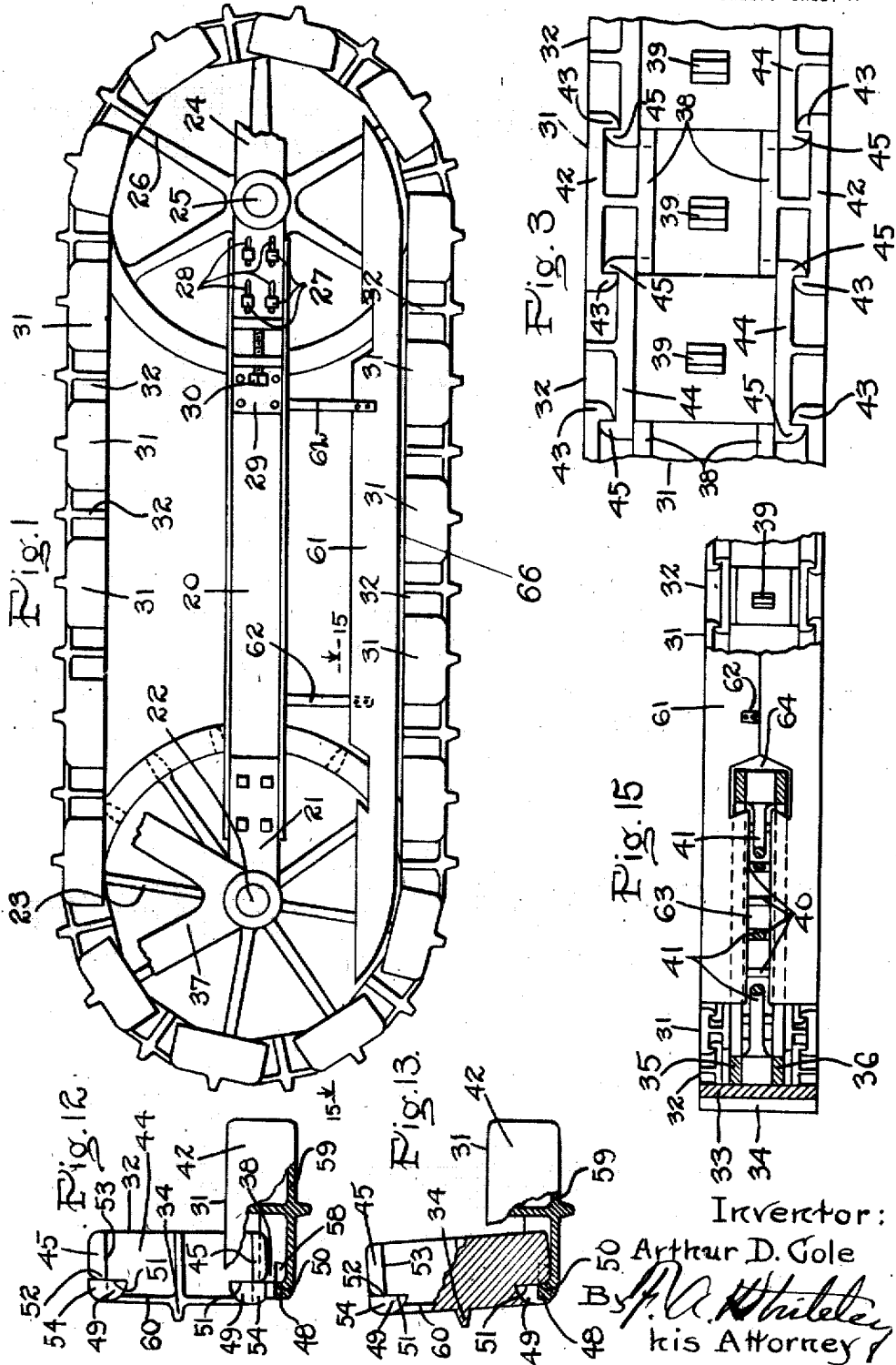


1,319,207.

Patented Oct. 21, 1919.

2 SHEETS—SHEET 1.



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his Attorney

1,319,207.

Patented Oct. 21, 1919.

2 SHEETS—SHEET 2.

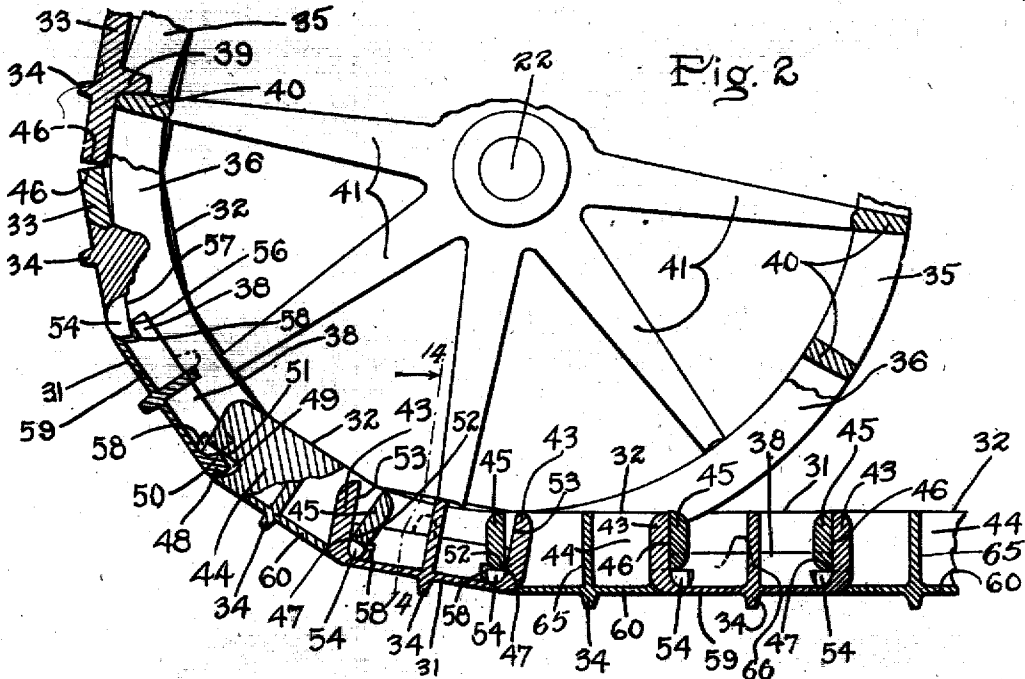


Fig. 2

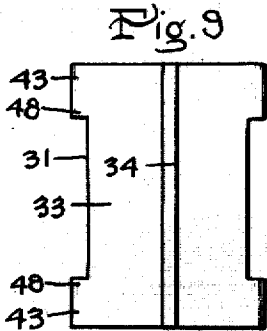


Fig. 9

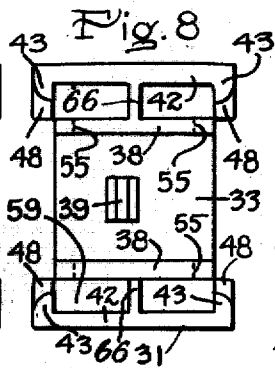


Fig. 8

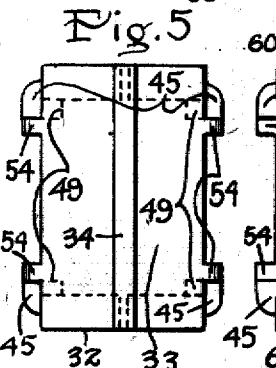


Fig. 5

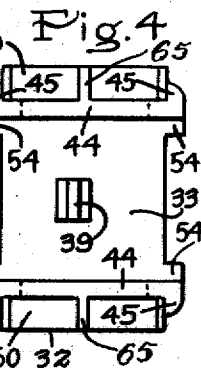


Fig. 4

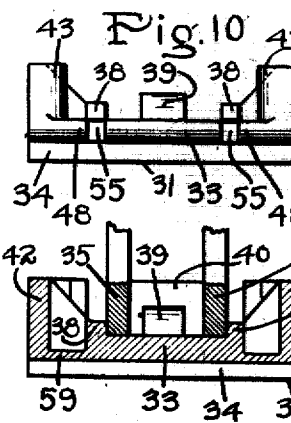


Fig. 10

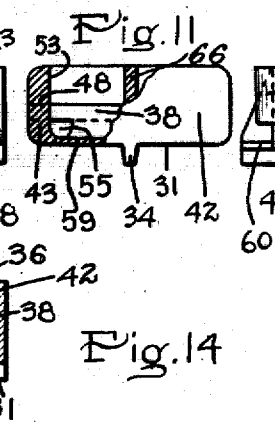


Fig. 11

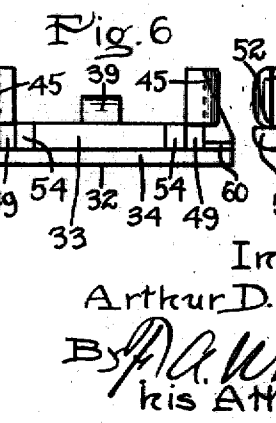


Fig. 6

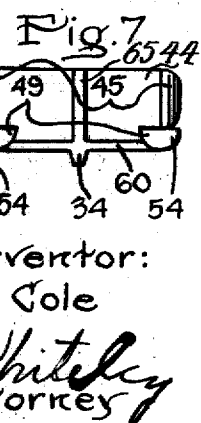


Fig. 7

Fig. 14

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UNITED STATES PATENT OFFICE.

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TRACTION-BELT.

1,319,207

Specification of Letters Patent.

Patented Oct. 21, 1919.

Application filed March 20, 1917. Serial No. 158,048.

To all whom it may concern:

Be it known that I, ARTHUR D. COLE, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Traction-Belts, of which the following is a specification.

My invention relates to traction belts for what is known as the caterpillar-type traction engine and has for its object to provide such a belt which shall be constructed of a plurality of plates formed of a single casting interconnected at the joints with extending hooked portions so that said plates may pivot in one direction while in the other direction the plates will be rigidly held from movement with their outer surface in a common plane. A specific object is to form the interconnecting elements so that the plates may be assembled by placing them at right angles to each other, from which position they may be hooked together and will become locked from dismounting when the belt passes over the supporting wheels and is in its outstretched position. Another object is to form the plates so that an imperforate continuous surface will be exposed to the ground. To this end I provide the plates with inwardly-projecting teeth which engage corresponding teeth between two spaced flanges of the driving wheels on which the belt rides.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

In the drawings, illustrating the application of my invention in one form,—

Figure 1 is a side elevational view of a caterpillar frame having my invention applied thereto. Fig. 2 is a fragmentary elevational view of the track or belt shown in Fig. 1 and one of the driving sprockets drawn to a larger scale and with some of the parts shown in section. Fig. 3 is a plan view of a portion of the outstretched track shown in Fig. 2. Figs. 4, 5, 6 and 7 are plan, bottom, side and end views, respectively, of one of the links or members of the track. Figs. 8, 9, 10 and 11 are views similar to Figs. 4, 5, 6 and 7 of a complementary track link. Figs. 12 and 13 are elevational views of a pair of links showing the manner of hooking the same together. Fig. 14 is a sectional view, taken on line 14—14 of Fig. 2.

Fig. 15 is a sectional view taken on line 15—15 of Fig. 1.

In the ordinary forms of caterpillar belts or tracks in which the links are formed with interconnecting means for supporting the belt in a plane against movement in one direction, said links are constructed of several pieces which must be bolted together or otherwise secured, adding greatly to the cost of the structure and which may at any time become loose and so cause damage to the tractor. I overcome these difficulties, as will now be explained.

My invention is shown in Fig. 1 as applied to a caterpillar frame and supporting means of ordinary construction. A longitudinal channel frame 20 has secured to it at one end castings 21 which are rigidly bolted thereto and which are pivotally mounted on an axle 22 carrying a rear supporting wheel 23. At the front end of frame 20 is slidably mounted a casting 24 which is journaled on an axle 25 carrying a front supporting wheel 26. Casting 24 is rigidly bolted to frame 20 by means of bolts 27 which pass through slots 28 in said casting. Rearward of casting 24 is rigidly secured to frame 20 a bracket 29 in which is mounted an adjusting screw 30 by means of which proper adjustment of the casting 24 may be obtained to secure the most desirable belt tension. The major portion of the tractor, which is not shown in the drawings, is supported on the caterpillar through brackets 37 pivoted on axle 22 and on the casting 24 secured to the front end of frame 20.

The track proper of the caterpillar comprises sets of complementary links or members 31 and 32 which are linked together in a manner to be presently described, and which are driven from the rear drive wheel 23 as follows: These links are formed with a plate-like portion 33 which engages the ground and which is provided with a rib 34 extending completely across the same on the under side thereof to prevent slipping. The wheel 23 is formed with two spaced annular rims 35 and 36 connected by spokes 41, which rims ride on the flat portions 33 of the links 31 and 32, said links being held on the wheel by a pair of guide ribs 38 formed on each of the links 31. An upwardly-extending gear tooth 39 is cast integral with the plate portions 33 of each of the links 31 and 32 and engages a corresponding tooth 40 ex-

tending between the rims 35 and 36 of the driving wheel. These latter teeth serve to hold said rims in spaced relation and are formed as continuations of spokes 41 whenever possible. In the construction shown every other tooth 40 is situated at the end of a spoke, though any suitable arrangement may be employed. As the wheels rotate, the belt is driven from the same through the teeth 39 and 40, which operate the same as the teeth of a rack and pinion having spaced teeth or considerable back lash.

The means for interconnecting the various links for driving and for causing the same to resist stresses in one direction when the track is outstretched, are best seen in Figs. 1 and 2, and in the details of each link. At the two extreme sides of each of the links 31 are formed upwardly-extending walls 42 which have inwardly-projecting ears or hook portions 43. Similar walls 44 formed on the links 32 have outwardly-projecting hook portions 45 which engage the hook portions 43 of the complementary links. It will be noted that the plates 33 meet along surfaces 46 formed by the edges thereof, and that hooks 43 and 45 extend beyond said edges so that their planes of contact lie in surfaces 46. In this manner hooks 43 and 45 transmit tensile stresses and the plates 33 compressive stresses, thus providing a rigid belt structure. When the links are outstretched or in facial alignment the same resist movement in one direction and provide an impervious rigid and continuous gripping or tractive surface in contact with the ground.

In constructing the hook members 43 and 45 the hooks 43 are made to extend below the upper surface of plate 33 and are connected therewith, while hooks 45 terminate on a level with the upper surfaces of said plates. As the track passes over the supporting wheels the links 32 rock on the links 31 through the lower corners 52 of hooks 45 which engage the surfaces 53 of the hooks 43 in planes 46 along a line 47 which is coincident with the intersections of the upper surfaces of plate 33 and the surfaces 46. This line is hence the axis of oscillation for each pair of links.

To deprive the various links of relative lateral motion, or to prevent the same from sliding apart along the surfaces 46, sets of engaging lugs and sockets are provided, which are clearly shown in the drawings. On the edges of links 31 are provided lugs 48 which are formed as extensions of the hook portions 43 and of the plates 33, and which are positioned inwardly of said hooks and extend beyond the surfaces 46 of the plate proper. Beneath the protruding portions of the walls 44 on links 32 are formed sockets 49 which extend inwardly beyond the surfaces 46 and which are adapted to receive the lugs 48, as is clearly shown in Fig. 2. It

becomes evident that the sockets 49 extend away from the surfaces of contact 46 to a greater extent than the lugs 48 extend beyond the same to permit said lugs to have movement within the same. The action of the lugs 48 and sockets 49 is similar to the hooks 43 and 45. Lugs 48 are formed with corners 50 which engage surfaces 51 within sockets 49 when the belt or track is bent, said surface being at a right angle to the plane of contact 46 and the line of contact formed thereby being coincident with the line of contact 47 of the hook members 43 and 45. In this manner the links are caused to pivot along the same axes through both the hooks 43 and 45 and the lugs 48 and sockets 49, and are restrained from lateral sliding in one direction by means of this last device. To prevent lateral sliding in the opposite direction a similar expedient is used. Adjacent the sockets 49 in member 32 are provided lugs 54 which are formed as continuations of the plates 33 thereof. These lugs fit into sockets 55 formed in links 31 under the guide ribs 38 thereof. A corner 56 of the rib 38 engages a surface 57 coincident with the top of plate 33 in the axis of oscillation of the respective links in a manner similar to the operation of lugs 49 and sockets 50. If the interconnection of links at 58 in Fig. 2 is observed, the operation of the joint can easily be comprehended. If in this case link 31 is held rigid and link 32 attempted to be moved downward, the motion of the same will be arrested when surface 51 thereof engages corner 50 of link 31. If, however, the said link is moved upward the movement of the same is arrested when surface 57 of link 32 engages corner 56 of link 31. In this manner perfect rocking or oscillation is effected without a hinge pintle and hinge straps. In constructing these lugs and sockets I prefer to form the portions thereof remote from the axes 47 with arcuate surfaces, so that as the links rock perfect freedom of movement of the same is effected, and so that the joints therein remain closed at all times and hence prevent dirt from passing through the same and decreasing the efficiency of the track or belt.

For assembling purposes the links are constructed as follows: Plates 33 are made somewhat thicker than the hooks 43 and 45 and are reduced in thickness in the respective links 31 and 32 at 59 and 60 at the extreme ends of the same where the hook portions 43 and 45 operate. In assembling the links reference to Figs. 12 and 13 is made. First a link 31 is placed in a horizontal position, as shown in Fig. 12, and a link 32 positioned over it in a vertical position with the upper surface of the plate portion 33 thereof coincident with the surface 46 of link 31. From this position link

32 may be moved downward into the position shown in Fig. 13, the formation of the various lugs and sockets being so constructed as to permit of this movement. Due to the proper dimensioning of the plates 33 and the reduced portions 59 and 60 thereof, all of the corners 50, 52, 56 and the corresponding engaging surfaces fall in alinement with the axis 47 of oscillation of the links when hook member 45 of link 32 reaches the plate portion 59 of link 31. Since all of the interlocking members are formed with arcuate surfaces circumscribed about the axis 47, the link 32 may be oscillated from the position shown in Fig. 13 to any of the normal positions shown in Fig. 2 from which the links cannot be unlocked or dismounted. Webs 66 extend across the cavities formed by the reduced portions 59 of the plate 33. Similar webs 65 extend outwardly from end plates 44 across the cavities formed by the reduced portions 60 of the plate 33. These reduced portions are thus sufficiently reinforced to serve the purpose of the traction surfaces.

From the description of the track it will become evident that practically no dirt or earth can pass through the track proper or between the links thereof or the interconnections of the same from below the track. To protect the track from above, a shed or roof 61 is employed, as is clearly shown in Figs. 1 and 15. This shed, which merely serves as a cover, is formed gabled and extends immediately above the lower portion of the track throughout the length of the same, being supported from the caterpillar frame 20 by means of hangers 62. In Fig. 15 it can be seen that the shed is formed with slots 63 and other apertures 64 through which the spokes and rims of wheels 23 and 26 may pass. In this manner the shed is caused to extend substantially throughout the length of the track and covers the interconnecting joints of the various links in the track. Any dirt that is dropped or thrown upon member 61 slides off the same and is deposited on the ground adjacent the track, thus keeping the track clean and insuring efficient operation of the same.

The advantages of my invention are manifest. An exceptionally rigid and durable track is produced with no parts to loosen or to get out of order. New links may easily be exchanged for worn-out or defective links in a very short time. The track is constantly kept clean, thus minimizing the friction and increasing the efficiency of the track.

A further particular advantage of my invention resides in the manner in which the roof 61 operates to keep the interior of the belt, and particularly the lug-receiving sprocket portions free from dirt. It is to be noted that the lower edges of roof 61 extend

in close proximity to the upper edges of up-standing portions 42 and 44 of the belt sections. For this reason, only fine dirt such as sand, dust, or mud, can pass into the interior of the lower run of the belt. In so far as this dirt tends to accumulate between the rims of the wheel and adjacent the sprocket teeth 39 and 40, it will be carried upwardly through the opening 64 in roof 61 or around the end of the wheel according to the direction in which the belt is being driven, and as the belt reaches its upper run position said dirt will discharge falling upon portions of the roof 61 by which it will be conveyed outside of the belt. In this manner, the belt sections clean themselves automatically of accumulations of dirt and discharge said accumulations to one side or the other of the moving belt. It is to be noted, also, in this connection that from the fact that the drive is really through contact of independent sprocket teeth with no pockets or holes into which said teeth extend if any larger obstruction, such as a stone, should be positioned on the belt adjacent a tooth when the tooth of the wheel approaches the same, it would tend to be displaced between the rims 35 and 36 and would not cause any injury to the belt or its driving means. This clearance for the co-acting sprocket teeth insures efficient action without trouble from stones or obstructions.

I claim:

1. A caterpillar traction belt comprising a multiplicity of, integrally formed members each having a base plate of substantial thickness with recesses extending therein along the sides of the plate but not through the same, adjacent pairs of said members having vertically extended portions with laterally and oppositely projected hooks adapted to interlock when assembled, and one only of each pair of said interlocking hooks being prolonged to form one side of its corresponding recess.

2. A traction belt for caterpillar type traction engines comprising a plurality of separate plates hingedly connected together, members on the plates having overlapping hook portions for holding the plates in rigid alinement from movement in one direction, one of said hook portions extending both below and above the axis of oscillation of the plates and the other of said hook portions extending above the axis and terminating at the same so that the links can bend till they make a right angle with one another.

3. A traction belt for caterpillar type traction engines comprising a plurality of separate plates, members on the plates having overlapping hook portions for holding the plates in rigid alinement from movement in one direction, one of said hook members terminating in an angular portion adapted

to engage an extended surface of the other member to form a pivotal connection between the plates, said plates being formed with recesses or cavities in which the hook portions may extend so that the plates may be oscillated at right angles to each other to permit unlocking of the hook members.

4. A caterpillar traction belt comprising a multiplicity of complementary pairs of sections, each section being constructed with an integrally formed base plate and end plates extending at right angles thereto, all of said base plates being of the same width, the end plates of one of said complementary members being at its extreme ends and the end plates of the other complementary members being positioned inwardly from the ends, and locking members on the end plates so that when the sections are assembled a traction belt is formed having a traction surface of uniform width.

5. A caterpillar traction belt comprising a multiplicity of complementary pairs of sections, each section being constructed with an integrally formed base plate and end plates extending at right angles thereto, all of said base plates being of the same width, the end plates of one of said complementary members being at its extreme ends and the end plates of the other complementary members being positioned inwardly from its ends, the base plates of the members having end plates at the extreme ends thereof being formed with cavities inside of said end plates, the end plates of the other complementary members being adapted to enter said cavities when the belt is flexed in one direction, and locking members on the end plates so that when the sections are assembled a traction belt is formed having a traction surface of uniform width.

6. A caterpillar traction belt comprising a multiplicity of pairs of sections, each section being constructed with an integrally formed base plate and end plates extending at right angles thereto, all of said base plates being of the same width, the end plates of one of said complementary members being situated at its extreme ends and the end plates of the other complementary mem-

bers being positioned inwardly from its ends, and webs extending at right angles to the end plates and the base plates inwardly from the end plates which are situated at the extreme ends of the base plates and outwardly from the end plates which are positioned inside of the ends of the base plates, and locking members on the end plates, so that when the sections are assembled a traction belt is formed having a traction surface of uniform width.

7. A caterpillar belt comprising a multiplicity of interconnected sections forming a continuous inner surface and comprising teeth centrally projected from the sections, and a drive wheel for said belt embodying a pair of spaced rims with tooth members formed between said rims so that the space between the rims is divided into sections open at each side, said rims rolling on the inner surface of the sections and the rim teeth cooperating with the section teeth to drive the belt.

8. A caterpillar traction belt comprising a multiplicity of interconnected sections forming a continuous inner surface and comprising teeth centrally projected inwardly from the sections, and drive wheels for said belt each of which has a pair of spaced rims and tooth members formed between said rims, some of the latter being constituted by the outer ends of spokes extending between the rims, said rim teeth cooperating with the section teeth to drive the belt.

9. A caterpillar traction belt comprising a multiplicity of sections having cooperating interlocking means so that when the sections are assembled a belt is formed having complete freedom for flexure in one direction and held rigid in a plane against flexure in the other direction, drive wheels for said belt, and a roof member covering the lower run of the belt, said roof member extending on each side of the drive wheels to receive dirt dropped from the wheels and belt and discharge the same outside of the limits of the belt.

In testimony whereof I affix my signature.

ARTHUR D. COLE.