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(54) SCRAPING APPARATUS FOR TRACK-TYPE VEHICLES

(71) We, CATERPILLAR TRACTOR CO., a corporation organized and existing under the laws of the State of California, United States of America, of 100 N. E. Adams Street, Peoria, Illinois 61629, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

A track-laying vehicle, such as a crawler tractor, has a pair of endless tracks mounted one on each side thereof to propel the tractor in both a forward and a rearward direction. Each track is normally entrained about an idler and driven by a sprocket wheel rotatably mounted on the tractor. During normal operation in moist soil, the track picks up abrasive foreign material which adheres to the track and decreases the traction of the tractor and accelerates wear of the sprocket wheel and other critical components. A crawler tractor is steered by forced track skewing. This skewing action causes the track to pick up foreign material and carry this material in the track which also causes accelerated wear of critical components. To ensure proper operation, foreign material must be removed from the track during operation in both forward and rearward directions. Any device which breaks up foreign material as the tractor moves in one direction only is insufficient to ensure proper operation of the vehicle. This is particularly true since track-laying vehicles normally spend a large portion of their time moving in a rearward direction.

According to the present invention, a track-laying vehicle has a frame; a pair of endless tracks, each track having a chain and shoes; and at least one scraping device having first and second scraping elements each having first and second opposed cut-

ting edges, the first scraping element being constructed and positioned for removing foreign material from the corresponding chain by a respective one of the cutting edges of the first scraping element during forward and rearward movement of the chain, and the second scraping element being constructed and positioned for removing foreign material from the corresponding shoes by a respective one of the cutting edges of the second scraping element during forward and rearward movement of the shoes.

Some examples of vehicles constructed in accordance with this invention are illustrated in the accompanying drawings, in which:—

Fig. 1 is a side view of a tractor with an elevated sprocket drive wheel;

Fig. 2 is a somewhat enlarged end view of an idler of the vehicle with the track removed;

Fig. 3 is a perspective view of one scraper device; and,

Fig. 4 is a side view of a more conventional tractor in accordance with the present invention.

Referring to Fig. 1, a track-laying vehicle, such as a crawler tractor 10, has an endless track 12 disposed on each side thereof. Each track 12 is entrained about a sprocket drive wheel 14 and one or more idlers 16. The idlers 16 are movably mounted on a frame 18 which has front and rear end portions 20 and 22. There are preferably front and rear idlers 24 and 26, respectively mounted on the end portions 20 and 22. The sprocket 14 can be at a higher elevation than the idlers 24 and 26. A single idler 28 generally aligned with a sprocket drive wheel 30 (Fig. 4) can also be used.

Referring to Fig. 2, the endless track 12 has a number of links 32 pivotally connected together to form a chain 34. A shoe 90

36 has a surface 38 and the shoes are connected to the links 32 in the chain 34.

- A scraping apparatus 40 is attached to one or both end portions 20 and 22 of the frame 18 (Fig. 1) and attached on one or both sides of the idlers 16. The scraping apparatus 40 is preferably at a lower elevation than the sprocket drive wheel 14. Referring to Fig. 3, the scraping apparatus 40 has first and second scraping elements 42 and 44, respectively. The first scraping element 42 has first and second opposed cutting edges 46 and 48, respectively. The first scraping element 42 has a construction preferably of a strong, durable, wear-resistant material, such as plate steel or the like, sufficient for removing foreign material from the chain 34. One of the respective cutting edges 46 and 48 of the first scraping element 42 removes foreign material from the chain 34 during forward movement of the chain and the other cutting edge removes foreign material during rearward movement of the chain. The first scraping element 42 may have a convexly curved edge (as shown in Figure 3) sufficient for spacing the cutting edges 46 and 48 a preselected distance from the shoes 36 in the installed position.
- The second scraping element 44 has first and second opposed cutting edges 50 and 52, respectively. The second scraping element 44 has a construction sufficient for removing foreign material from the shoes 36 along surface 38 and is preferably constructed of material similar to that used to construct the first scraping element 42. One of the respective cutting edges 50 and 52 removes foreign material from the shoes 36 during forward movement of the shoes and the other cutting edge removes foreign material from the shoes 36 during rearward movement of the shoes. The second scraping element 44 preferably has a general diverging "C" configuration and is such that the cutting edges 50 and 52 on the arms of the C are spaced a preselected distance from the shoes 36 in the installed position. The first and second scraping elements 42 and 44 form a generally triangular configuration (Fig. 2).

The scraping apparatus 40 includes a brace 54 connected to and extending between the first and second scraping elements 42 and 44, respectively. The scraping apparatus also includes a plate 56 on which the scraping elements 42 and 44 are mounted. The brace 54 can also be mounted on the plate 56. The plate 56 preferably has a number of holes 58 for movably mounting the plate on the end portions 20 and 22 of the frame 18. The plate 56 is removably mounted, as by a nut and bolt assembly or the like (not shown). A shim (not shown) can be used to adjust the plate 56

to position the four cutting edges 46, 48, 50 and 52 at preselected positions relative to the track 12. It may be desirable, for instance, to position the cutting edges 46, 48, 50 and 52 close to the track 12, within a half inch or so, when operating in mud or moist soil alone. When operating in moist soil containing rocks, it may be desirable to position the cutting edges 46, 48, 50 and 52 at a distance greater than an inch or so. In this way the cutting edges 46, 48, 50 and 52 can be adjusted to compensate for track movement caused by movement of the idlers 16, a loose or worn track, or various other conditions.

In the operation of the tractor 10, the sprocket wheel 14 drives the endless track 12 to propel the tractor 10 and track 12 in both the forward and rearward directions. The scraping apparatus 40 removes foreign material from the chain 34 and shoes 36 of the track 12 as the tractor 10 operates in the forward and rearward directions. The cutting edges 46, 48 and 50, 52 of each scraping element 42, 44 which function to remove foreign material from the track 12 are the particular cutting edge of each apparatus first contacted by the track when going in a forward or rearward direction. The material removed from the chain 34 by the first scraping element 42 is urged onto the second scraping element 44 where it joins material removed from the shoes 36 by the scraping element 44. The generally "C" shaped second scraping element 44 urges material away from the chain 34 towards the outside of the track 12.

WHAT WE CLAIM IS:—

1. A track-laying vehicle having a frame; a pair of endless tracks, each track having a chain and shoes; and at least one scraping device having first and second scraping elements each having first and second opposed cutting edges, the first scraping element being constructed and positioned for removing foreign material from the corresponding chain by a respective one of the cutting edges of the first scraping element during forward and rearward movement of the chain, and the second scraping element being constructed and positioned for removing foreign material from the corresponding shoes by a respective one of the cutting edges of the second scraping element during forward and rearward movement of the shoes.

2. A vehicle according to claim 1, which includes an idler movably mounted at one end of the frame, the scraping device being connected to that one end of the frame, and a sprocket drive wheel of the track is positioned at a higher elevation than the scraping device.

3. A vehicle according to claim 1 or claim 2, including a plate fixed to the first

36 has a surface 38 and the shoes are connected to the links 32 in the chain 34.

A scraping apparatus 40 is attached to one or both end portions 20 and 22 of the frame 18 (Fig. 1) and attached on one or both sides of the idlers 16. The scraping apparatus 40 is preferably at a lower elevation than the sprocket drive wheel 14. Referring to Fig. 3, the scraping apparatus 40 has first and second scraping elements 42 and 44, respectively. The first scraping element 42 has first and second opposed cutting edges 46 and 48, respectively. The first scraping element 42 has a construction preferably of a strong, durable, wear-resistant material, such as plate steel or the like, sufficient for removing foreign material from the chain 34. One of the respective cutting edges 46 and 48 of the first scraping element 42 removes foreign material from the chain 34 during forward movement of the chain and the other cutting edge removes foreign material during rearward movement of the chain. The first scraping element 42 may have a convexly curved edge (as shown in Figure 3) sufficient for spacing the cutting edges 46 and 48 a preselected distance from the shoes 36 in the installed position.

The second scraping element 44 has first and second opposed cutting edges 50 and 52, respectively. The second scraping element 44 has a construction sufficient for removing foreign material from the shoes 36 along surface 38 and is preferably constructed of material similar to that used to construct the first scraping element 42. One of the respective cutting edges 50 and 52 removes foreign material from the shoes 36 during forward movement of the shoes and the other cutting edge removes foreign material from the shoes 36 during rearward movement of the shoes. The second scraping element 44 preferably has a general diverging "C" configuration and is such that the cutting edges 50 and 52 on the arms of the C are spaced a preselected distance from the shoes 36 in the installed position. The first and second scraping elements 42 and 44 form a generally triangular configuration (Fig. 2).

The scraping apparatus 40 includes a brace 54 connected to and extending between the first and second scraping elements 42 and 44, respectively. The scraping apparatus also includes a plate 56 on which the scraping elements 42 and 44 are mounted. The brace 54 can also be mounted on the plate 56. The plate 56 preferably has a number of holes 58 for movably mounting the plate on the end portions 20 and 22 of the frame 18. The plate 56 is removably mounted, as by a nut and bolt assembly or the like (not shown). A shim (not shown) can be used to adjust the plate 56

to position the four cutting edges 46, 48, 50 and 52 at preselected positions relative to the track 12. It may be desirable, for instance, to position the cutting edges 46, 48, 50 and 52 close to the track 12, within a half inch or so, when operating in mud or moist soil alone. When operating in moist soil containing rocks, it may be desirable to position the cutting edges 46, 48, 50 and 52 at a distance greater than an inch or so. In this way the cutting edges 46, 48, 50 and 52 can be adjusted to compensate for track movement caused by movement of the idlers 16, a loose or worn track, or various other conditions.

In the operation of the tractor 10, the sprocket wheel 14 drives the endless track 12 to propel the tractor 10 and track 12 in both the forward and rearward directions. The scraping apparatus 40 removes foreign material from the chain 34 and shoes 36 of the track 12 as the tractor 10 operates in the forward and rearward directions. The cutting edges 46, 48 and 50, 52 of each scraping element 42, 44 which function to remove foreign material from the track 12 are the particular cutting edge of each apparatus first contacted by the track when going in a forward or rearward direction. The material removed from the chain 34 by the first scraping element 42 is urged onto the second scraping element 44 where it joins material removed from the shoes 36 by the scraping element 44. The generally "C" shaped second scraping element 44 urges material away from the chain 34 towards the outside of the track 12.

WHAT WE CLAIM IS:—

1. A track-laying vehicle having a frame; a pair of endless tracks, each track having a chain and shoes; and at least one scraping device having first and second scraping elements each having first and second opposed cutting edges, the first scraping element being constructed and positioned for removing foreign material from the corresponding chain by a respective one of the cutting edges of the first scraping element during forward and rearward movement of the chain, and the second scraping element being constructed and positioned for removing foreign material from the corresponding shoes by a respective one of the cutting edges of the second scraping element during forward and rearward movement of the shoes.

2. A vehicle according to claim 1, which includes an idler movably mounted at one end of the frame, the scraping device being connected to that one end of the frame, and a sprocket drive wheel of the track is positioned at a higher elevation than the scraping device.

3. A vehicle according to claim 1 or claim 2, including a plate fixed to the first



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- and second scraping elements and being detachably connected to the frame.
4. A vehicle according to any one of the preceding claims, wherein the first
5 scraping element is convexly curved towards the shoes so that the first and second cutting edges of the first element are spaced from the shoes.
- 10 5. A vehicle according to any one of the preceding claims, wherein the second scraping element is of a generally C-shaped configuration, and the first and second cutting edges of the second element are provided by an edge of each arm of the C and
are spaced from the shoes. 15
6. A vehicle according to any one of the preceding claims, including a brace connected to and extending between the first and second scraping element.
7. A vehicle according to claim 1, sub-
stantially as described with reference to
any one of the examples illustrated in the
accompanying drawings. 20
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