

Dec. 1, 1959

M. VANDER BERG ETAL

2,914,866

CLEANING ATTACHMENT FOR DITCHING MACHINES

Filed June 4, 1957

3 Sheets-Sheet 1

Fig. 1

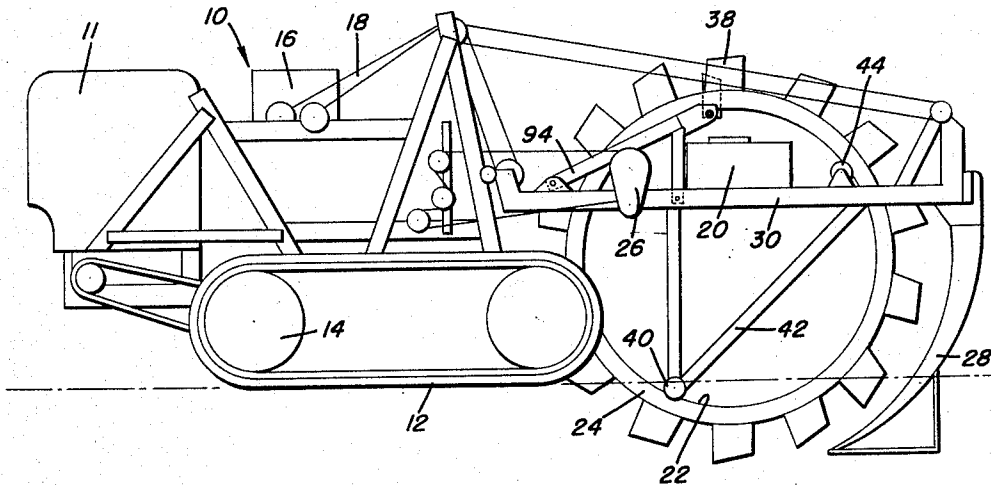


Fig. 7

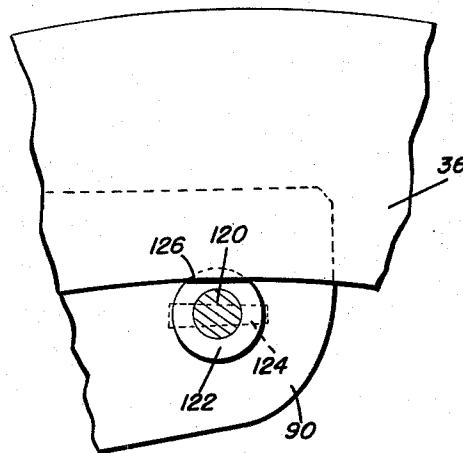


Fig. 6

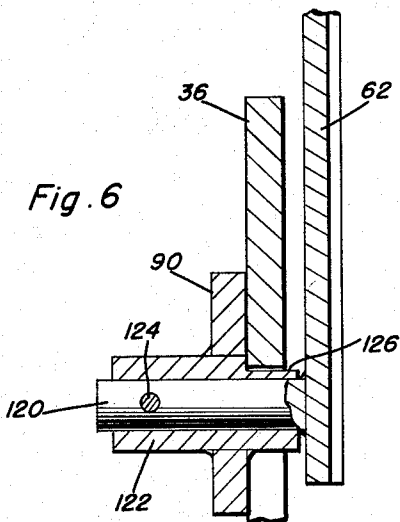
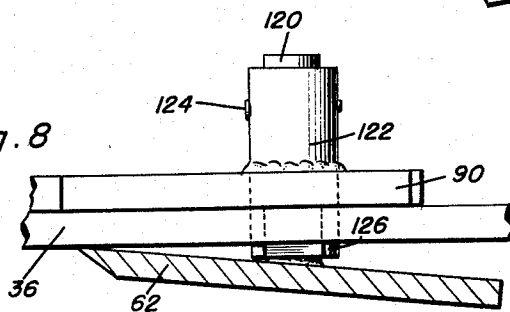


Fig. 8



Mike Vander Berg
Peter A. Kooiman
INVENTORS.

BY *Alfonso A. Wilson*
and *Harvey E. Jordan*
Attorneys

Dec. 1, 1959

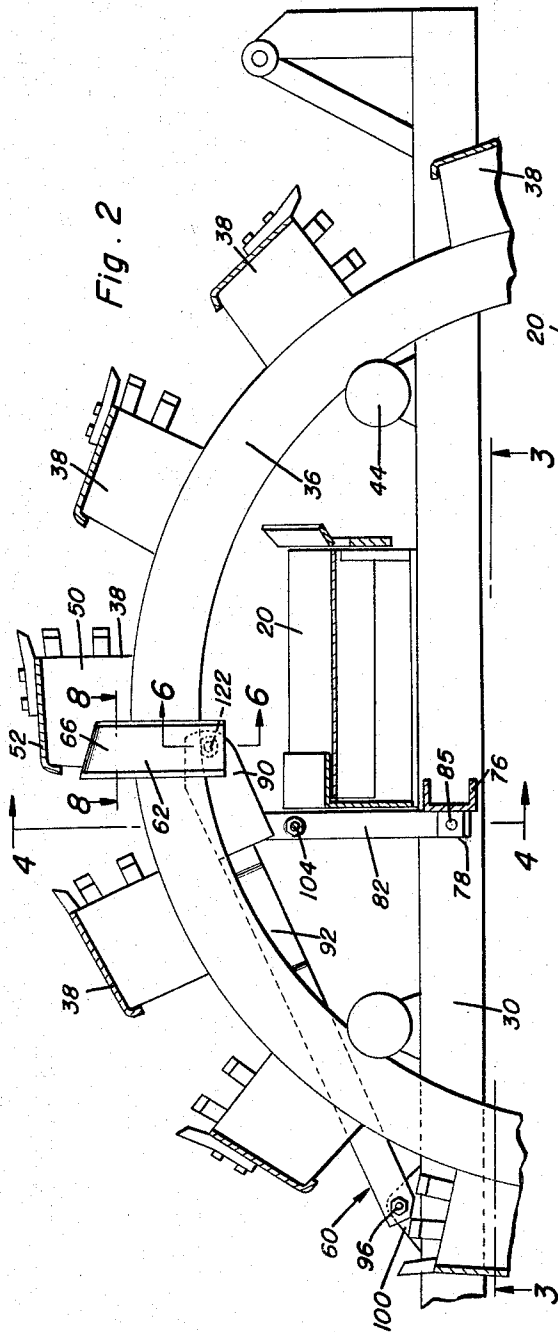
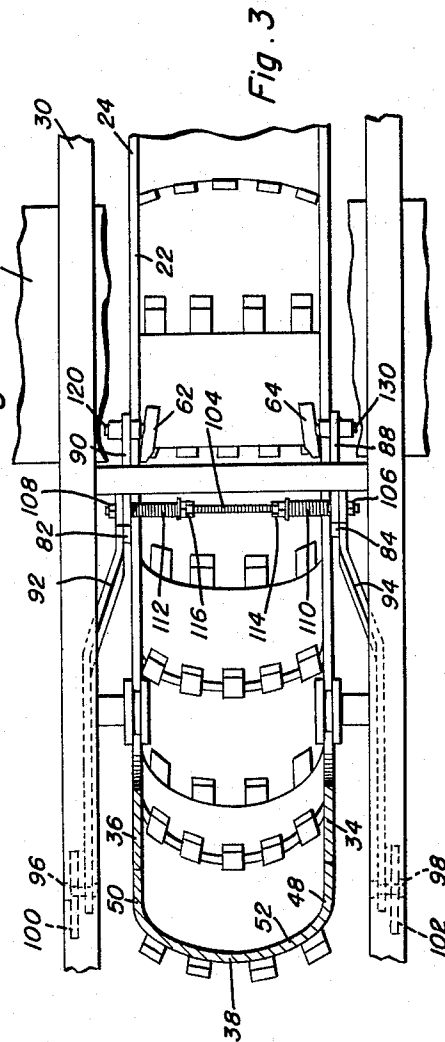
M. VANDER BERG ET AL

2,914,866

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3 Sheets-Sheet 2



Mike Vander Berg
Peter A. Kooiman
INVENTORS.

BY *Almona A. Kooiman*
and Harvey B. Jackson
Attorneys

Dec. 1, 1959

M. VANDER BERG ET AL

2,914,866

CLEANING ATTACHMENT FOR DITCHING MACHINES

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3 Sheets-Sheet 3

Fig. 4

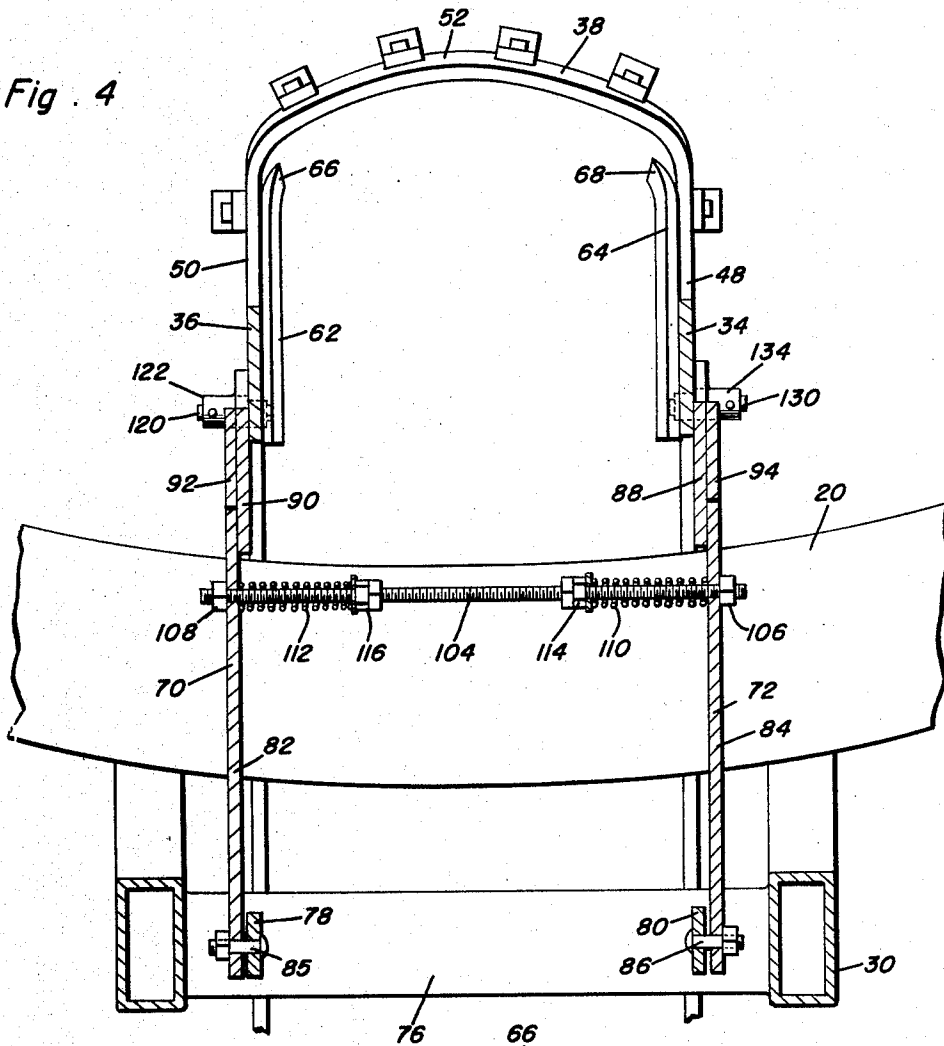
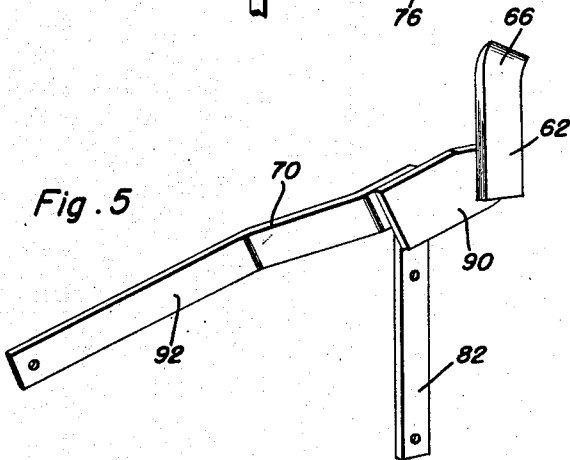


Fig. 5



Mike Vander Berg
Peter A. Kooiman
INVENTORS.

BY *Alvanice A. Kooiman*
and Harvey R. Jordon
Attorneys

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CLEANING ATTACHMENT FOR DITCHING MACHINES

Mike Vander Berg, Edgerton, and Peter A. Kooiman,
Chandler, Minn.

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2 Claims. (Cl. 37-97)

This invention relates to ditching machines and more particularly to a cleaning attachment for the wheel type bucket trench or ditch digging machines.

In the normal and usual operation of machines for trenching, ditching or similar operations, it often happens that the buckets and the sides of the wheel which supports the buckets become encumbered with clods that adhere to the bucket surfaces and the inside surfaces of the wheel. As a result the time of operation for a given length of travel is materially increased. The footage per hour capability of the machine sometimes becomes reduced to the point of a very material reduction in income that the machine is capable of earning. Soil conditions, such as the type of soil, its moisture content, etc., aggravate this problem.

Accordingly, an object of this invention is to provide an attachment which automatically cleans the inside surfaces of the sides of the wheel and the buckets, the attachment having blades which smoothly separate the clods from the surfaces of the wheel and the surfaces of the buckets. In this way the clods are separated from the wheel, keeping it clean notwithstanding the soil conditions within which the machine is working.

A further object of the invention is to provide an attachment for a wheel type digging machine that has a number of buckets on the wheel, the attachment providing means by which the clods that are accumulated on the wheel during its normal operation, are separated by a cutting action as opposed to pushing the same from the surfaces that accumulate clods. Therefore, the invention is embodied in one and preferably a pair of blades mounted within the sides of the digging wheel and extending into the area enclosed by the buckets that are carried by the wheel. Since the wheel of most manufacturers' makes of trenchers is capable of random motion within confined limits that is, capable of slight side movement and other deflections, my cutters are arranged to that they are capable of being deflected within necessary tolerances. In addition the blades are spring loaded toward the inside, confronting surfaces of the sides of the wheel and the buckets. Therefore the blades follow the travel of the wheel notwithstanding the random path that the wheel takes in allowing necessary deflections during the normal operation of the trencher.

A further object of the invention is to provide a practical attachment for a trench digging machine whereby the normal operation and functioning of the wheel of the machine is completely unimpeded but yet, the clods that adhere to the wheel and its buckets, are separated from the wheel and the buckets and are permitted to be gravity lowered onto the discharge conveyor that operates through the area that is confined by the wheel.

Other objects and features of importance will become apparent in following the description of the illustrated form of the invention.

In the drawings:

Figure 1 is an elevational view of a typical trencher

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that has been provided with an attachment in accordance with the invention;

Figure 2 is a fragmentary sectional view showing the relationship of a scraper attachment mounted within the wheel of the trencher in Figure 1;

Figure 3 is a fragmentary view taken approximately on the line 3-3 of Figure 2;

Figure 4 is an enlarged sectional view taken on the line 4-4 of Figure 2;

Figure 5 is a perspective view of one blade and a part of the means to mount that blade in the wheel of the trencher in Figure 1;

Figure 6 is an enlarged sectional view taken on the line 6-6 of Figure 2 showing a detail of the support in Figure 5;

Figure 7 is an elevational view of the detail in Figure 6; and

Figure 8 is an enlarged sectional view taken on the line 8-8 of Figure 2.

In Figure 1 there is a standard trench or ditch digging machine 10 which schematically represents any manufacturer's make of like or analogous machines. Among the standard parts of the machine 10 are the motor hood 11, track 12, wheels 14 on which the track is mounted for rotation, the hoist 16, hoist cable 18 and endless conveyor 20. The conveyor is passed through the opening 22 enclosed by wheel 24 and is powered by a driving connection with conveyor transmission 26. Crumbling shoe 28 is at the front of the machine and is carried by crumbling shoe frame 30 to which hoist cable 18 is attached. Frame 30 is lowered and lifted by cable 18, frame 30 being pivoted at its inner end on the machine 10. Wheel 24 has a pair of sides 34 and 36 together with a plurality of buckets 38. The wheel is elevated and lowered with the frame 30 inasmuch as it is supported on lower idler rollers 40. These are carried by framework 42, while the upper idler rollers 44 are carried by frame 30. Digging wheel 24 is actuated by a drive shaft (not shown) drivingly connected to conveyor transmission 26 and extending across frame 30 and which is driven by power taken from the engine under motor hood 11. Many manufacturers' makes of machines use a drive shaft extending through opening 22 of its wheel 24, the drive shaft having a pair of sprockets which are engaged with teeth formed on the wheel 24. The drive shaft is actuated by a chain or some other means of transmitting torque and under the control of the machine operator.

Buckets 38 are U-shaped and have sides 48 and 50 together with an end 52 connecting the sides. The sides of the buckets are welded or otherwise attached to sides 34 and 36 of wheel 24 so that the buckets function not only to serve a digging operation but also to help rigidify the wheel.

When operating in some types of soil clods attach to the inner surfaces of the wheel and buckets and materially decrease the capability of the machine. A constantly cleaned machine provides for an appreciable efficiency increase thereby resulting in a considerably longer life of the machine and an increase in yield of trench or ditch per hour of machine operation. Therefore my attachment 60 is applied to machine 10 and it maintains the wheel 24 in a clean condition automatically and in response to ordinary machine operation. This is achieved with practically no power loss or losses which are so small that they are not only negligible but are practically immeasurable. Attachment 60 is constructed of two blades 62 and 64, each having a sharpened leading edge and each being located between the confronting inner surfaces of the wheel sides 34 and 36 and protruding within the confines of the buckets 38. The blades are essentially flat and have inwardly directed upper ends 66 and 68, respectively, to help to strip the clods which

accumulate at the junctions of the bucket sides and bottoms of the buckets. The blades of my attachment strip the clods from the inner surfaces of wheel 24 rather than push them. Moreover the blades are comparatively stationary (capable of some deflection as described subsequently) with respect to the wheel and not interdigitated with the teeth of the buckets. It has been found that by stripping along the inner side surfaces of the wheel, the large, heavy volumetric clods are stripped from the wheel and carry with them the great majority of adherent soil making it unnecessary to scrape or push from between the teeth of the buckets.

Support 70 for the blade 62 is disposed on the left side of frame 30 while support 72 for blade 64 is disposed on the right side of frame 30. These supports are identical in construction and are mounted in corresponding places on the left and right side respectively of frame 30.

A transverse frame member 76 is welded to the sides of frame 30 and extends through opening 22 of wheel 24. Frame member 76 is located close to the discharge conveyor 20 and has a pair of brackets 78 and 80 fixed to one surface of it. Uprights 82 and 84 of supports 70 and 72, respectively, are attached by pins 85 and 86 to the mounting brackets 78 and 80, and the upper ends of each upright are welded to plates 90 and 88. Arms 92 and 94 are mounted on the outside of the wheel sides and have their upper ends welded to the plates 90 and 88, respectively. The lower ends of the two arms 92 and 94 are mounted on pins 96 and 98. These pins are located in holes that are formed in mounting brackets 100 and 102 on the sides of frame 30. The supports, therefore, are made essentially in the form of triangular braces. There is considerable clearance left between the mounting brackets 78, 80 and uprights 82, 84. The same clearance arrangement is between the arms 92, 94 and mounting brackets 100, 102.

The uprights 82 and 84 and hence, the supports 70 and 72, are spring loaded outwardly of each other. Blades 62 and 64 are attached to the upper ends of the supports and more particularly, to the plates 90 and 88. This means that the spring bias applied to the supports will bring the blades close to the inner surfaces of the wheel sides 34 and 36 and the sides 48 and 50 of the buckets 38. These means consist of a bolt 104 which extends transversely across opening 22 and through holes in the uprights 82 and 84. Nuts 108 and 106 are at the ends of the bolt and on the outside surfaces of uprights 82 and 84, respectively. Coil springs 110 and 112 are disposed on bolt 104 and bear against stops 114 and 116 adjustably mounted on bolt 104. The stops are constituted by bolts and a washer. Therefore the bias of springs 110 and 112 is against the inner sides of supports 70 and 72 and press them outwardly of each other. Limited deflection of the supports is possible in view of the looseness with which the supports are mounted on their pins.

Blade 62 has a stud 120 which extends laterally from its outer face. The stud is passed through a bearing 122 carried by plate 90. Shear pin 124 extends through aligned holes in bearing 122 and stud 120. Side 36 of wheel 24 is located between the confronting surfaces of blade 62 and plate 90, and a flat bearing surface 126 is formed on the upper part of bearing 122 to enable free rotation of the side 36 of wheel 24 but provide a smooth bearing should occasional contact with the wheel be made at this point. Blade 64 is mounted in an identical fashion that is, has its stud 130 passed through bearing 134 which is welded or otherwise fixed to plate 94 at the upper part of support 72. As shown in Figure 8 the blades 62 and 64 are angled slightly toward the inner surfaces of the sides of the wheel so that the sharpened edge of each blade scrapes along the surfaces of the wheel sides. Correct stripping results from this arrangement.

The location of the blades 62 and 64 is such that when the clods are stripped from wheel 24, they fall on the cradle part of the discharge conveyor 20 and are emptied in a windrow with the remainder of the dug soil, alongside of the trench that is being formed.

The operation of a ditcher, trencher, or analogous machine is unaltered by the presence of attachment 60. However, as the wheel 24 of the typical machine 10, is rotated to perform the cutting operation and delivery of dug soil onto the discharge conveyor 20, the inside surfaces of the sides of the wheel are automatically cleaned. The blades 62 and 64 have their front edges arranged to face the direction of travel of the wheel sides and the bucket sides so that the inner surfaces of the wheel are scraped. The cutters are located in the correct position to have the clods that are scraped from the wheel, emptied onto the discharge conveyor 20 and carried off to the side of the trench.

When the wheel deflects, the deflection is compensated for in attachment 60 by having the supports 70 and 72 mounted in such a way that they, too, deflect in unison with the sides of the wheel. The supports are spring loaded in the proper direction to hold the blades 60 and 62 in contact with the wheel sides. The angulated upper ends 66 and 68 fall away from the sides 50 and 48 of the buckets 38 in order to exert an extracting force on the clods in addition to the remainder of the blades functioning to strip the same clods from the wheel. Another function of the angulated ends 66 and 68 of the blades is to direct the clods onto the discharge conveyor 20 located below the blades.

It is understood that various changes may be made in the invention without departing from the scope of the following claims.

What is claimed as new is as follows:

1. For use on a trencher which has a rotary wheel provided with buckets that are attached to the spaced sides thereof, a scraper attachment comprising a pair of supports, said supports each having arms located on the outside of said wheel, blades located on the inside of said wheel and adapted to contact the inner confronting surfaces of the sides of the wheel, means attaching said blades to said arms, uprights constituting a part of each support, means mounting said arms and said uprights for limited lateral deflection so that said blades may be kept in contact with the inner surfaces of the wheel when said wheel is deflected, and resilient means reacting on said supports and biasing said supports in a direction to bring said blades into contact with the inner surfaces of said wheel.

2. For use on a trencher which has a rotary wheel provided with buckets that are attached to the spaced sides thereof, a scraper attachment comprising a pair of supports, said supports each having arms located on the outside of said wheel, blades located on the inside of said wheel and adapted to contact the inner confronting surfaces of the sides of the wheel, means attaching said blades to said arms, uprights constituting a part of each support, means mounting said arms and said uprights for limited deflection so that said blades may be kept in contact with the inner surfaces of the wheel when said wheel is deflected, resilient means reacting on said supports and biasing said supports in a direction to bring said blades into contact with the inner surfaces of said wheel, parts of said blades being disposed within the confines of said buckets, and said blades having angulated parts which scrape and displace the clods as they are being separated from the wheel.

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