Feb. 19, 1946. C. H. ANDERSON 2,395,160

CLEANING AND SCOURING MACHINE

Filed May 10, 1945 3 Sheets-Sheet 1

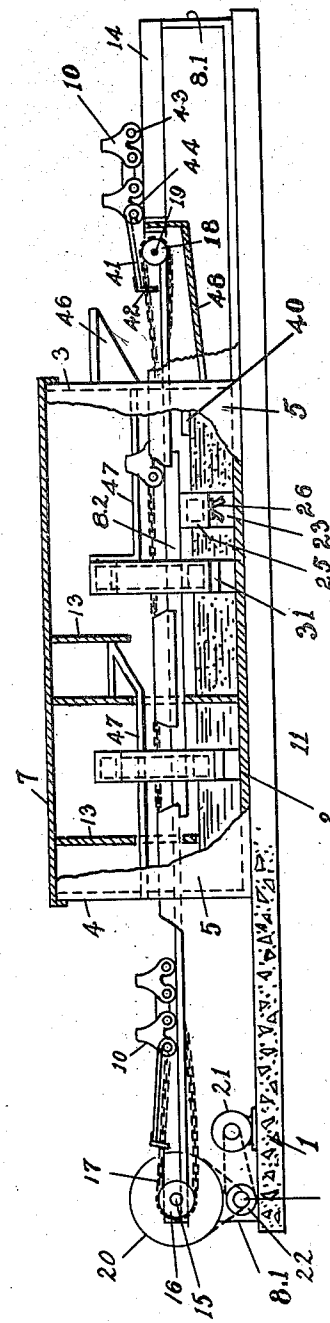


Fig 1

INVENTOR.
Clifford H. Anderson
BY Bush & Bush
His Attorneys.

Feb. 19, 1946. C. H. ANDERSON 2,395,160

CLEANING AND SCOURING MACHINE

Filed May 10, 1945 3 Sheets-Sheet 2

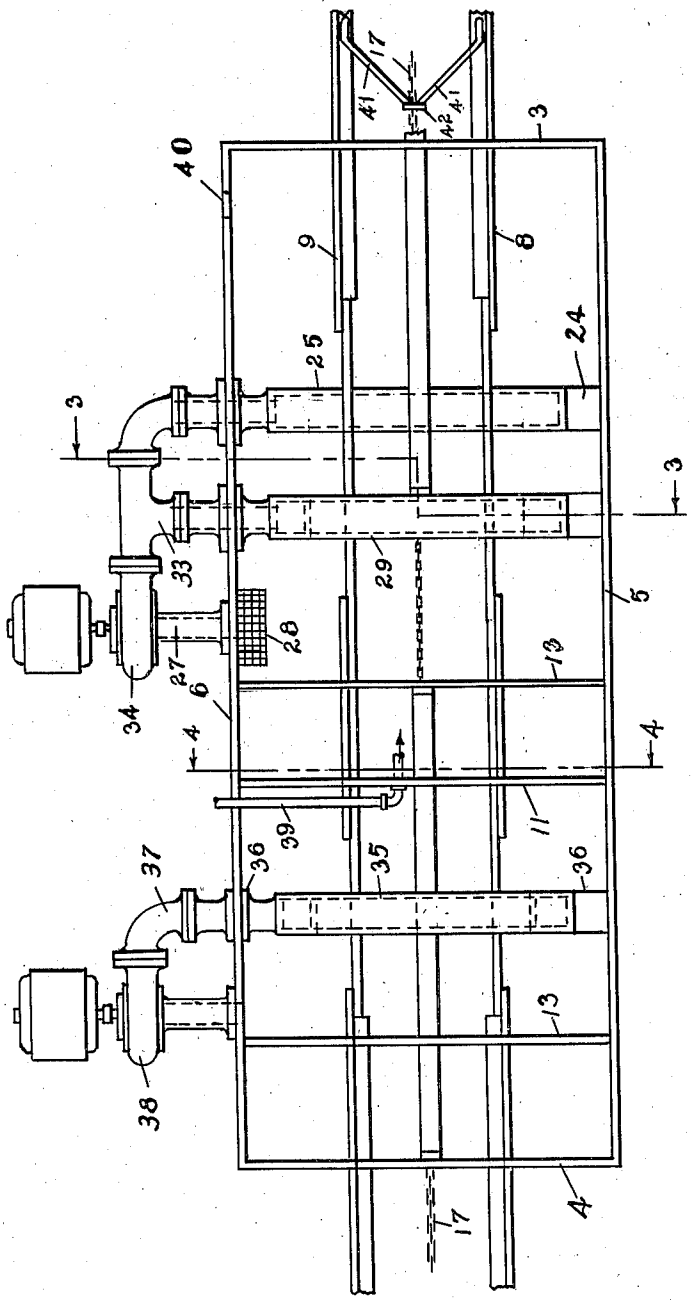


Fig 2

Clifford H. Anderson INVENTOR.

BY Burdett Bush

His Attorneys.

Feb. 19, 1946. C. H. ANDERSON 2,395,160

CLEANING AND SCOURING MACHINE

Filed May 10, 1945 3 Sheets-Sheet 3

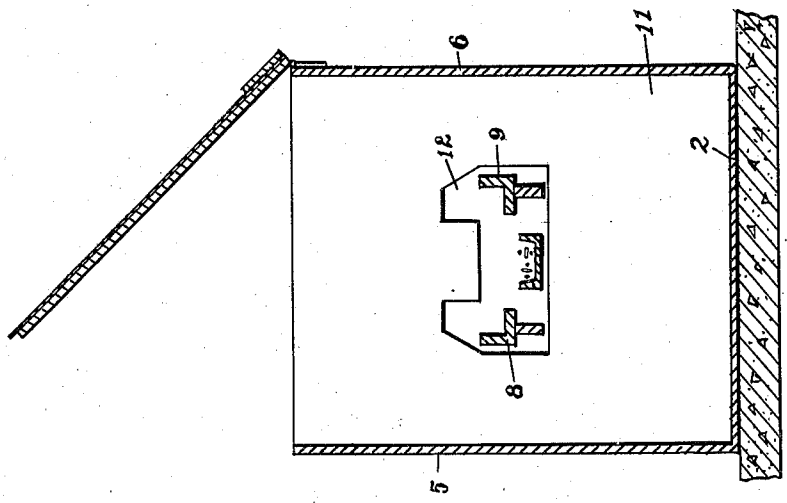


Fig 4

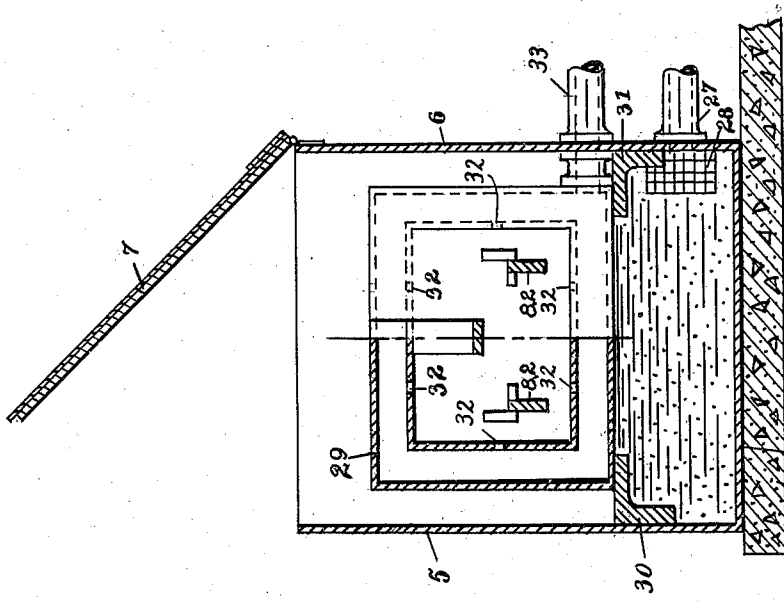


Fig 3

Clifford H. Anderson INVENTOR.

BY Bush & Bush
His Attorneys.

Patented Feb. 19, 1946

2,395,160

UNITED STATES PATENT OFFICE

2,395,160

CLEANING AND SCOURING MACHINE

Clifford H. Anderson, Davenport, Iowa

Application May 10, 1945, Serial No. 592,937

8 Claims. (Cl. 51—8)

My invention relates to cleaning and scouring machines to clean and scour metals and metal parts of other machines. It is well known that the treads or tracks of vehicles and machines of the Caterpillar type such as trucks, tractors, tanks, gun-mounts, road graders, bulldozers, steam shovels and other similar vehicles and machines having caterpillar treads or tracks, are obliged to travel over all kinds of soil, including wet, muddy and swampy ground whereby the tracks become wet, muddy, dirty, rusty and sometimes greasy and when dry are found coated with clay, dirt, rust and other extraneous matter to such an extent that the shoes and the pivot pins on which the shoes of the tracks are pivoted, become immovable or so nearly so as to impair or destroy their usefulness.

Likewise, when such machines become damaged in warfare and are allowed to stand idle for any length of time, the pivots and the shoes mounted thereon become rusted together so as to prevent the flexibility essential to their effective operation.

When the tracks get in this condition, it is advisable to either discard them or recondition them by cleaning and scouring off the dirt and rust from both sides as well as from the top and bottom of the shoes; also to clean out the bores and to clean the pivot pins to free them from rigidity and restore the necessary flexibility to the tracks.

Hitherto this cleaning has been done by manually scraping and filing or sandpapering, all of which are long, slow, expensive processes and cannot be readily and effectively done without demounting and separating the shoes and their pivots and connectors. Further, such manual cleaning or any dry mechanical cleaning, exposes the workers to the inhalation of large quantities of fine dust, rust, etc., with serious injury to health.

It is the main object of my invention to provide apparatus by which large sections of such tracks or treads comprising a plurality of shoes coupled together, can be thoroughly flushed out, cleaning and scoured so as to rid them of the accumulations of clay, earth, sand, rust, grease or other extraneous matters and to free the pivot joints and to freshen and smooth up the outer ends of the connectors and pivots so that they will travel freely within their guides; also to put them in favorable condition for repainting or coating with an oily paint or other coating which will protect them against rust and act to some extent as a lubricant for the pivot joints and to do this in a way which will not expose the workman to injury from inhaling dust.

While my invention was designed primarily for use on tank tracks, it is obvious that it may be used for cleaning and scouring the surfaces of metal machine parts generally which are capable of being conveyed through my apparatus and subjected to the streams of abrasive liquid therein.

A convenient form of my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my apparatus, but with the near side of the tank broken away to show the parts mounted therein;

Figure 2 is a top or plan view of the tank with the cover removed;

Figure 3 is a cross-sectional elevation on the line 3—3 of Figure 2;

Figure 4 is a sectional detail on the line 4—4 of Figure 2.

Similar numerals refer to similar parts throughout the several views.

My machine may be mounted upon any suitable floor or foundation 1. It comprises a tank preferably of metal having a bottom 2, ends 3 and 4, sides 5 and 6, and a tight cover 7 which may extend the full length of the tank or cover only a part of the tank as desired. Supporting bars 8 and 9 extend lengthwise through the tank and project outwardly at both ends thereof for a distance approximately equal to the length of one of the track sections 10, which may conveniently be about one-fourth of a complete tread or track of an ordinary Caterpillar tank.

These supporting bars are welded or otherwise united to the ends 3 and 4 of the tank and also to a transverse baffle 11 which extends from the top to the bottom of the tank and across from side to side, but has an opening 12 to permit the passage of the sections 10 through it.

One or more additional supporting baffles 13 may be mounted in the upper half of the tank to aid in supporting the bars 8 and 9.

The outer ends of the bars 8 and 9 may also be supported by legs 8.1 or any other suitable form of support. At the front or receiving end of the tank I provide a table 14 upon which a section to be cleaned may be deposited by an overhead crane or any desired form of handling device.

At the rear end of the supporting bars 8 and 9 I mount a transverse shaft 15 having a chain-sprocket 16 secured at the middle thereof which carries and operates an endless chain 17 the other end of which is carried by an idler sprocket 18 mounted upon a suitable shaft 19 pivoted in

the supporting bars 8 and 9 outside the front end of the tank.

The sprocket 16 may be driven by a belt or gear wheel 20 actuated by a motor 21 through suitable gearing 22 or other driving means.

In the front end of the tank I mount upon suitable supports 23 and 24, a conduit or manifold 25 having jets or openings 26 provided therein by which streams of liquid may be projected downwardly.

The tank is filled with water or other liquid to about the top of the manifold or conduit 25 and a quantity of sharp river sand or other abrasive is mixed with the water in a mechanical mixture. The downwardly projecting jets 26 in the manifold 25 keep the water and sand stirred up in a mechanical mixture.

A pump intake 27 is secured in the bottom of the tank below or near the manifold 25 and may be provided with a screen 28 to screen out any large chunks of rock or other extraneous material which would not readily pass through the jets.

A rectangular tubular wet-blast manifold 29 is mounted upon suitable supports 30 and 31 carried by the side plates 5 and 6 of the tank. This wet-blast manifold is provided with a plurality of openings or jets 32 opening inwardly from the top, sides and bottom of the rectangular tube whereby the abrasive liquid under high pressure may be projected inwardly against the sides, top and bottom of the tread sections as they pass through the rectangular manifold.

The manifold 29 is supplied with abrasive liquid under high pressure through a tube 33 through which the abrasive liquid is forced by the pump 34. The manifolds 25 and 29 may be fed by the same pump 34 or if desired, separate pumps may be used for each manifold.

At the rear of the transverse baffle 11 a similar manifold 35 may be similarly mounted within the tank upon supports 36 and supplied with water under pressure by a pipe connection 37 from the pump 38.

An additional water pipe 39 may be mounted upon the transverse baffle 11 or other suitable support to project water upon the sections after they have passed through the wet-blast manifold 29 so as to wash off the sand or other abrasive and prevent its being carried into the water end of the tank.

An outlet or overflow 40 is arranged in one side of the tank at the top of the liquid level which will carry off excess water and with it the colloidal clay, grease and lighter elements which are washed off the tank sections.

At the front end of my apparatus, I provide a triangular guide plate 46 the large end of which is united to the end plate of the tank and the smaller end projects forwardly and this plate acts as a guide to carry the approaching shoes of the section downwardly until the connecters will ride upon the supporting bars 8 and 9. Hold-down bars 47 are mounted inside of the tank and may be united to the ends and to the baffles to prevent vertical displacement of the tank section while passing through the machine.

At the front end of the machine I provide a triangular chute 48 to catch the abrasive fluid which may be thrown through the opening in the front end plate of the tank and carry it back into the tank.

In the operation of my apparatus a tank section is placed upon the table 14 and attached to the chain by rods 41 which converge at one end and are fastened to a downwardly projecting plate 42 having a notch or slot cut therein which will straddle one of the vertical links of the chain 17. The other ends of the rods are provided with hooks 44 arranged to embrace the projecting ends of one of the pivot bars 45 at one end of the track section.

The chain motor is then started and the chain drags the section into the tank with the shoe connecters resting upon the supporting bars 8 and 9. These supporting bars are preferably formed of angle iron with the connecters riding upon the horizontal flanges and the vertical flanges acting as guides to prevent lateral movement of the track sections.

The vertical flanges of the angle iron are cut away for a considerable distance at and along each side of the wet-blast manifold so that the abrasive liquid driven through the lateral jets can strike the outer ends of the pivot pins and the connecters of the tank sections with full force and reinforcing bars 8.2 may be added to aid in supporting the sections through this portion of their travel.

As the sections pass through the rectangular wet-blast manifold they are subjected to a violent blast of the abrasive liquid coming out of the jets under high pressure and their rate of travel is adjusted so as to cause them to be exposed to such blast long enough to thoroughly soak, loosen up and blast out the dirt and rust and to scour off the ends of the pivot pins and connecters as well as to clean out the extraneous material between the pivot pins and the bores of the connecters if necessary; also to smooth up and to a considerable extent polish the outer surfaces thereof so as to prepare them for the application of an oily coating of paint, lubricating or other protective material.

At the same time the upper and lower jets direct an intensive blast of the abrasive liquid against the top and bottom of the shoes and clean off the dirt and to a considerable extent remove the rust therefrom, although I find it preferable to leave a certain amount of rust upon the tops and bottoms of the shoes as when combined with the coating mentioned, it will afford additional protection against further rusting.

After a given section passes to the rear from the wet-blast manifold, it is subjected to a stream of clear water to wash off the sand into the main tank and is then led through the washing manifold and more thoroughly washed and then carried by the chain out of the tank and to the rear where it may be picked up by an overhead crane or other suitable handling device.

In practice, the sections are then heated by dipping in a tank of hot water, then taken out, dried and dipped in the tank of oily paint or other protective coating.

By "high pressure" in the claims I refer to a pressure of approximately 40 pounds per square inch or sufficient to cause the abrasive liquid to do the desired work in the time allowed, but this will depend somewhat upon the size and form of the parts, the condition, amount and nature of the extraneous matter, rust and corrosion to be removed and the time of exposure.

In actual practice I have found a pressure of 40 pounds per square inch sufficient to recondition the general run of tank tracks traveling through the machine at a rate of about 6'' to 1' per minute with the water carrying about as much sharp river sand as it will readily carry in fluid state. Such treatment not only removes the caked earthy

materials from the connecters and shoes but also removes rust and corrosion and to some extent smooths and polishes the outer faces of the shoe-connecters and the ends of the pivot pins.

In the case of larger surfaces to be reconditioned or of rough or deeply pitted surfaces or harder metals, the pressure and the time of exposure should be increased proportionately.

While I prefer water and sand for my abrasive fluid on account of cheapness and convenience, it is obvious that other liquids such as oils or acid solutions and other abrasives such as emery or "Carborundum" may be substituted.

Various modifications may be made in the size, form and proportions of my machine and I do not limit my claims to the precise forms shown in the drawings.

I claim:

1. A cleaning and scouring machine including a tank to contain a fluid mixture of water or other suitable liquid and sand or other abrasive material, supports mounted in the tank to support the parts to be cleaned, a manifold surrounding the supports inside of the tank arranged to conduct the fluid abrasive mixture under high pressure to jets or outlets formed in the manifold through which the mixture may be forcibly sprayed upon and against the parts to be cleaned, and means to supply the manifold with the fluid mixture under high pressure.

2. A cleaning and scouring machine as described in claim 1 and a second manifold arranged to project streams of liquid downwardly into the mixture to agitate the mixture to keep the abrasive in suspension and to limit settling thereof.

3. A cleaning and scouring apparatus as described in claim 1, said means comprising a power operated force pump.

4. A cleaning and scouring apparatus as described in claim 1, said means comprising a power operated force pump having an intake leading to the lower part of the tank and an outlet opening into the manifold.

5. A cleaning machine including a tank containing a fluid mixture of water or other suitable liquid and sand or other granular abrasive material, supporting bars mounted in the tank and extending outwardly through the ends thereof, chain sprockets upon shafts revolvably mounted in or on the supporting bars at or near opposite ends thereof, an endless chain carried by said sprockets and driven by at least one of them, a supporting table at the receiving end of said supporting bars arranged to receive the parts to be cleaned, a removable connecter adapted at one end to be attached to the chain and at the other end to be attached to the matter to be cleaned whereby the chain may draw such matter from the table and through the tank upon the supporting bars, a manifold within the tank surrounding the supporting bars arranged to conduct the abrasive mixture under high pressure to jets or outlets formed in the manifold through which the mixture may be forcibly sprayed upon and against the parts to be cleaned, means to actuate the driving sprocket and means to supply the manifold with the abrasive liquid under high pressure.

6. A machine to clean and scour metal parts, including a double compartment tank containing in one compartment a fluid mixture of water or other suitable liquid with sand or other granular abrasive material, and in the other compartment water or other washing liquid, supporting bars mounted in the tank and extending outwardly through the ends thereof, a pair of chain sprockets revolvably mounted upon the supporting bars at or near opposite ends thereof, an endless chain passing over and actuated by at least one of said sprockets, a supporting table at the receiving end of said supporting bars arranged to receive the parts to be cleaned, removable attaching rods adapted at one end to be detachably connected to the chain and at the other end to be attached to the matter to be cleaned whereby the chain may draw the matter to be cleaned from the table and through the tank upon the supporting bars, manifolds surrounding the supporting bars inside the tank one of which is arranged to conduct the abrasive mixture under high pressure to jets or outlets formed in the manifold through which the mixture may be forcibly sprayed upon and against the parts to be cleaned and the other arranged to project streams or sprays of water or other washing liquid upon said parts to wash off the abrasive liquid, means to actuate the driving sprocket and means to supply the manifolds respectively with the abrasive liquid or water under high pressure.

7. A machine to clean and scour metal parts including a double compartment tank capable of containing in one compartment a fluid abrasive mixture of water or other suitable liquid with sand or other granular abrasive material, and in the other compartment water or other washing liquid, supporting bars mounted in the tank and extending outwardly through the ends thereof, said bars having flanges to guide the parts moving thereon, a pair of chain sprockets revolvably mounted upon the supporting bars at or near opposite ends thereof, an endless chain passing over and actuated by one of said sprockets, a supporting table at the receiving end of said supporting bars arranged to receive the parts to be cleaned, removable attaching rods adapted at one end to be detachably connected to the chain and at the other end to be attached to the matter to be cleaned whereby the chain may draw the matter to be cleaned from the table and through the tank upon the supporting bars, manifolds surrounding the supporting bars inside the tank one of which is arranged to conduct such an abrasive mixture under high pressure to jets or outlets formed in the manifolds through which the mixture may be forcibly sprayed upon and against the parts to be cleaned, and the other arranged to project streams or sprays of water or other washing liquid upon said parts to wash off the abrasive liquid, means to actuate the driving sprocket and means to supply the manifolds respectively with the abrasive liquid and with water under high pressure.

8. A machine to clean and scour metal parts including a double compartment tank to contain in one compartment a fluid abrasive mixture of water or other suitable liquid with sand or other granular abrasive material, and in the other compartment water or other washing liquid, supporting bars mounted in the tank and extending outwardly through the ends thereof, said bars having flanges to guide the parts moving thereon, a longitudinal guide bar mounted in the tank above and between the supporting bars to prevent upward displacement of the metal parts, a pair of chain sprockets revolvably mounted upon the supporting bars at or near opposite ends thereof, an endless chain passing over and actuated by one of said sprockets, a supporting table at the receiving end of said supporting bars arranged to receive the parts to be cleaned, removable at-

taching rods adapted at one end to be detachably connected to the chain and at the other end to be attached to the matter to be cleaned whereby the chain may draw such matter from the table and through the tank upon the supporting bars, manifolds surrounding the supporting bars inside the tank one of which is arranged to conduct the abrasive mixture under high pressure to jets or outlets formed in the manifolds through which the mixture may be forcibly sprayed upon and against the parts to be cleaned, and the other arranged to project streams or sprays of water or other washing liquid upon said parts to wash off the abrasive liquid, means to actuate the driving sprocket and means to supply the manifolds respectively with the abrasive liquid or water under high pressure.

CLIFFORD H. ANDERSON.