

PATENT SPECIFICATION (11)

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(54) TRACTOR-BOWL SCRAPER

(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
 5 Street, Peoria, State of 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 par-
 10 ticularly described in and by the following
 statement:—

Wheeled-tractor-bowl scrapers pose a
 shipping problem when they are delivered to
 a job site or a customer on a railway flat
 15 car or are driven on a public highway. In
 particular, the width and low operating pro-
 file of such scrapers require special ship-
 ping techniques. For example, our U.S.
 Patent Specification No. 3,015,173 discloses
 20 the detachment and placing of the draft
 arms of the bowl scraper in the scraper bowl
 to reduce the width thereof for shipping
 purposes. In addition, such patent speci-
 25 fication discloses the use of a bracket which
 is secured between a draft tube and the
 apron of the scraper bowl. Also, our U.S.
 Patent Specification no. 3,893,250 discloses
 the detaching of the draft arms of the bowl
 30 scraper from the exterior of the sidewalls of
 the scraper bowl, the attachment of the
 draft arms interiorly of the sidewalls of the
 scraper bowl and attachment via a bracket
 to the draft tube of a tractor.

In accordance with the invention, a trac-
 35 tor scraper comprises a bowl scraper having
 a scraper bowl connected to a tractor by a
 draft connection having a laterally extending
 draft tube positioned between the tractor
 and the scraper bowl, and a pair of laterally
 40 spaced draft arms which are selectively
 mountable in operative and travelling posi-
 tions; each arm having a first end with a
 laterally projecting trunnion mounting which
 45 is connectable in the operative position di-
 rectly to the outside of a corresponding side
 wall of the scraper bowl and in the travel-
 ling position to and spaced, by a spacer
 interposed between the trunnion mounting

and side wall, from the inside of the cor-
 responding side wall of the scraper bowl,
 50 and a second end, which is connectable in
 the operative position to a corresponding
 end of the draft tube and in the travelling
 position to a substantially flat bracket de-
 55 pending from the corresponding end of the
 draft tube.

The invention may thus provide an im-
 proved, economical and non-complex rigid
 transport assembly for tractor-bowl scrapers.

One example of a tractor-scraper con-
 60 structed in accordance with the invention is
 illustrated in the accompanying drawings, in
 which:—

Figure 1 is a elevation of the tractor-
 bowl scraper shown in its operating con-
 65 dition;

Figures 2 is a partial view similar to
 Figure 1, but showing the tractor-bowl
 scraper rearranged in a travelling condition;

Figure 3 is a view taken in the direction
 70 of the arrows III—III in Figure 2; and,

Figures 4, 5, and 6 are enlarged partial
 sectional views taken in the direction of ar-
 rows IV—IV in Figure 1 and V—V and
 75 VI—VI in Figure 2, respectively.

Figure 1 illustrates a tractor-bowl scraper
 10 comprising a two-wheeled tractor 11 con-
 nected to a bowl scraper 12 by a gooseneck
 13 and a pair of laterally spaced draft arms
 14 one of which is illustrated. Each draft
 80 arm 14 has a first end 15 mounted exteriorly
 on a sidewall 16 of the scraper bowl of the
 bowl scraper 12 by a trunion assembly 17.
 A second end 18 of each draft arm carries
 a laterally projecting connection terminating
 85 in an annular flange 19 which is offset from
 the draft arm and attached to a like flange
 20 (Figure 3) of a laterally extending draft
 tube 21 by circumferentially disposed cap
 90 screws 22.

The tractor-bowl scraper 10 further com-
 prises a pair of lift piston cylinder units 23,
 one of which is illustrated in Figure 1, sup-
 95 ported on the draft tube 21. The lift units
 23 function to selectively raise or lower the
 attached scraper bowl of the bowl scraper

12. An apron 24 is pivotally mounted within the scraper bowl selectively to open or close the front (open) end thereof by means of a piston cylinder unit partially shown at 25, a lift frame 26 and a link 27.

When it is desired to transport the tractor-bowl scraper 10 to a remote location, such as by railroad flat car or by driving it on a public highway at a relatively high speed (e.g., 50 k.p.h.), workmen will proceed to rearrange the tractor-bowl scraper 10 to its Figure 2 transport condition. Firstly, apron 24 is raised above and later rested upon the draft arms 14 which are detached from the exterior of the scraper bowl of the bowl 12 and the draft tube 21 by releasing trunion assemblies 17 and cap screws 22. Each draft arm is rotated 180° to has its first end 15 mounted interiorly on a scraper 28. The spacer 28 is itself mounted as a by plurality of bolts interiorly on a respective sidewall 16, with trunnion assembly 17, which is itself moved along with each draft arm 14 from the exterior of a side wall 16 to the interior thereof, mounted to the spacer 28 and more particularly to a side of the spacer 28 spaced from the interior of the sidewall 16 (Fig. 5) whereby each draft arm 14 is a distance, d, from the interior of the sidewall 16.

The second end 18 of each draft arm 14 is connected to a lateral end of the draft tube 21 by a vertically disposed transport bracket 29. As more clearly shown in Figure 3, the transport bracket 29 comprises longitudinally spaced first and second end portions 30 and 31, respectively, integrally connected together in straight relationship by an intermediate portion 32, the transport bracket 29 being thus generally flat. The first and second end portions 30 and 31 of the transport bracket 29 are substantially coincident with the faces of the flanges 19 and 20 respectively. Thus, there is no need for providing an expensive bracket with off set (generally non-planar) end portions which might be subject to fatigue or even failure or might require expensive machining and/or welding to strengthen it between said end portion thereof. The end portions 30 and 31 of bracket 29 have mounting means formed therein, such as circumferentially disposed holes 33 and 34 which align with underlying holes 35 and 36, respectively formed in flanges 19 and 20, respectively.

The cap screws 22 can thus be utilized to attach the ends 30 and 31 of the bracket 29 to the flanges 19 and 20. Semi-circular cut-outs 37 and 38 may be formed on each end of the bracket 29 to provide guide means, conforming to an inner radius of flanges 19 and 20, to precisely align holes 33 with underlying holes 35 and holes 34 with underlying holes 36.

A bumper 39 is provided attached interiorly to a sidewall 16 of the scraper bowl

of the tractor-bowl scraper 10. The bumper 39 is placed intermediate the ends 15 and 18 of the draft arm 14 and serves to prevent the scraper bowl of the bowl scraper 12 from shifting, sideways relative to the draft arms 14 and to prevent the arms from rocking back and forth and contacting the interiors of the sidewalls 16. Thus, the bumpers 39 serve to protect the draft arms 14, the interior of the scraper bowl of the bowl scraper 12, the bracket 29 and the bolts or the like connecting the draft arms 14 to the scraper bowl of the bowl scraper 12 and to the bracket 29 from strain and resulting fatigue and possible failure. The bumpers 39 extend between the respective sidewall 16 and the respective one of the draft arms generally the spaced distance, d.

Upon transport of the tractor-bowl scraper to its job site or the like, the above procedure may be reversed. In particular, the brackets 29 would be removed from the draft arms 14 and the draft tube 21 and the draft arms along with the trunnion 17 would be reattached to the scraper bowl of the bowl scraper 10 as shown in Figure 1. As is more apparent from Figures 4 and 5 the same set of threaded bores 40 can be used to attach the spacer 28 to the interior of the sidewall 16 as are used to attach the trunnion assembly 17 to the exterior thereof.

WHAT WE CLAIM IS:—

1. A tractor-bowl scraper comprising a bowl scraper having a scraper bowl connected to a tractor by a draft connection having a laterally extending draft tube positioned between the tractor and the scraper bowl, and a pair of laterally spaced draft arms which are selectively mountable in operative and travelling positions; each arm having a first end with a laterally projecting trunnion mounting which is connectable in the operative position directly to the outside of a corresponding side wall of the scraper bowl and in the travelling position to and spaced, by a spacer interposed between the trunnion mounting and sidewall, from the inside of the corresponding side wall of the scraper bowl, and a second end, which is connectable in the operative position to a corresponding end of the draft tube and in the travelling position to a substantially flat bracket depending from the corresponding end of the draft tube.

2. A tractor-bowl scraper according to claim 1, wherein the spacers are removable and are arranged to be removed for use of the tractor-bowl scraper in the operating position.

3. A tractor-bowl scraper according to claim 1 or claim 2, wherein the trunnion mountings provide a pivotal connection between the draft arms and scraper bowl side

12. An apron 24 is pivotally mounted within the scraper bowl selectively to open or close the front (open) end thereof by means of a piston cylinder unit partially shown at 25, a lift frame 26 and a link 27.

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2. A tractor-bowl scraper according to claim 1, wherein the spacers are removable and are arranged to be removed for use of the tractor-bowl scraper in the operating position.

3. A tractor-bowl scraper according to claim 1 or claim 2, wherein the trunnion mountings provide a pivotal connection between the draft arms and scraper bowl side



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walls in both the operative and travelling positions.

4. A tractor-bowl scraper according to any one of the preceding claims, wherein the brackets each extend vertically downwardly from the draft tube in the travelling position.

5. A tractor-bowl scraper according to any one of the preceding claims, including bumper means mounted in the travelling position between each sidewall of the scraper bowl and the corresponding draft arm between the ends of the draft arm, the bumper means extending substantially fully between the side wall and draft arm.

6. A tractor-bowl scraper according to claim 5 wherein the bumper means comprise a pair of bumpers each mounted in the travelling position on the corresponding side wall.

7. A tractor-bowl scraper according to any one of the preceding claims, wherein each bracket comprises first and second arm portions integrally connected together in straight relationship by an intermediate portion the first end portion being connected in the travelling position to an annular flange secured to the second end of the corresponding draft arm and the second end portion being connected to an annular flange secured on the corresponding end of the draft tube.

8. A tractor-bowl scraper according to claim 7, wherein each of the end portions is provided with mounting means comprising

a plurality of holes disposed in semi-circular relationship.

9. A tractor-bowl scraper according to claim 8, including a semi-circular cut-out formed through each of the first and second end portions of the bracket, a respective plurality of holes being circumferentially disposed about a respective one of the cut-outs.

10. A tractor-bowl scraper according to any one of the preceding claims, wherein the second end of each draft arm is provided with a laterally projecting connection for connecting to the draft tube or bracket and to provide an offset between the positions occupied by the draft arm in its operative and travelling positions the draft arm being arranged to be turned through substantially 180° about its length when being changed over from its operative position to its travelling position or vice versa.

11. A tractor-bowl scraper according to any one of the preceding claims, wherein the scraper bowl has a front apron which is arranged to rest on the draft arms in the travelling position.

12. A tractor-bowl scraper according to claim 1, substantially as described in the accompanying drawings.

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