SCOOPE AND LOADER ATTACHMENT FOR TRACTORS

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Our invention relates to improvements in material handling and moving devices designed for attachment to a tractor and is a continuation-in-part of our co-pending application carrying the same title, Serial No. 690,028, filed October 14, 1957, now Patent No. 3,048,292. This application is also a division of our copending application, Serial No. 794,655, filed February 20, 1959, now Patent No. 3,079,021, and is entitled to the filing date thereof.

One of the important objects contemplated herein is the provision of a loader attachment for a tractor having improved means for elevating the same so as to provide maximum force in initially lifting a load.

Another object herein is to provide a loader attachment of the above class having means for varying the height to which a load can be elevated.

Further objects include novel stabilizing means for the scoop during its use and means for adjusting the inclination of a plunger plate used thereupon.

Other objects and advantages of this invention reside in the details of construction and correlation of the various parts and will be apparent as the description proceeds.

This invention consists of novel parts and combination of parts to be hereinafter described whereby the objects set forth are obtained, as pointed out in the claims hereinafter made and illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a tractor showing a preferred embodiment of our invention mounted thereon.

FIG. 2 is an enlarged perspective view of the scoop used with our loader attachment and having portions cut away to more clearly illustrate the construction thereon.

FIG. 3 is a side elevational view of our loader attachment, partly in section and partially elevated, and showing the pusher plate on the scoop in its rearward position.

FIG. 4 is a side elevational view similar to FIG. 3 showing the pusher plate in its forward position.

FIG. 5 is a side elevational view showing the scoop elevated with the broken lines indicating the dumping position of the scoop.

FIG. 6 is a fragmentary perspective view illustrating the scoop converted for holding cement or the like to be delivered to a point of use and showing the pusher plate retracted.

FIG. 7 is a side elevational view of the device in FIG. 6 showing the pusher plate extended.

FIG. 8 is a fragmentary perspective view of the rear of the scoop to show the releasable lock means between which one end of the scoop is mounted.

FIGS. 9—11 inclusive are enlarged fragmentary side elevational views, partly in section, to indicate the adjustable positions of inclination of the pusher plate.

Referring to the drawings a tractor is designated generally by the numeral 12 and is illustrative of the type of equipment to which our invention is applicable. A frame structure for our scoop and hoist apparatus includes a pair of elongated spaced beams 14 and 16 placed astraddle the tractor and the front wheel assembly 18 so as to be pivotally secured at respective opposite sides of the tractor to the rear axle and to extend forwardly therefrom beyond the wheels 19 for pivotable attachment to the scoop assembly 20 as will later be referred to in more detail. A transverse brace 22 connects beams 14 and 16 just rearwardly of scoop 20. A pair of scissor type hoists indicated generally at 24 are carried at the forward end of the tractor so that one is on each side thereof (FIG. 1) and supported by a dual frame means 26. Such frames are of like construction and are arranged relative to beams 14 and 16, and like parts will be given like numerals although only the frame relative to beam 14 as seen in FIG. 1 will be described in detail. Frame 26 is generally of an inverted V-shape having a rear brace 28 secured to the rearward portion of beam 14 and extending upwardly and forwardly therefrom to be pivotally attached to the outer end portion 30 of a support bar 32 disposed at the side of the tractor engine 34 and extending transversely of the longitudinal axis thereof. A front brace 36 extends from the inner end portion 38 of support 32 downwardly and forwardly to the cross bar 22. Front braces 36 on frames 26 are braced by the cross member 40 and by the longitudinal X braces 41 extending from the respective outer ends 30 of supports 32 to the opposite frame brace 36 where it is secured to bar 22. Each support 32 carries a pair of depending spaced ears 42 and at each side of the forward end of the tractor frame 44 there is a pair of upstanding spaced ears 46 which, as seen in the drawings, is in a vertical plane of the axle of the front wheel assembly 18.

Hoist 24 comprises an upper 48 and lower 50 arm oppositely disposed relative to each other and pivotally secured together at their respective forward ends as shown at 52. The forward end of the upper arm 48 is pivotally attached to ears 42 on support 32 and the forward end of arm 50 is pivotally attached to ears 46 on tractor frame 44. A hydraulic jack 54 has its cylinder end 56 pivotally attached to ears 46 and its plunger rod end similarly attached to the upper arm 48 as indicated and illustrated in the drawings.

The rear of sides 62 and 64 define upstanding supports 68 which are connected across their top edges by the plate or bar 70. The forward end of beams 14 and 16 are pivotally secured to the respective outer sides 62 and 64 of scoop 20 (FIG. 2) so that no bolts or pins project inwardly within the confines of the scoop. This is accomplished by securing a plate 72 to the outer side of the scoop, said plate being turned out and back to form a U bracket 74. The forward ends of beams 14 and 16 are positioned in said respective brackets 74 and a pin 76 passed through bracket 74, the beam end and seats in plate 72. Spaced ears 78 are provided on bracket 74 to which a spring 80 locks pin 76 to ears 78. In this way pin 76 cannot be dislodged and beams 14 and 16 are effectively pivotally connected to the scoop. Scoop floor 60 is reinforced against warping and buckling by the depending spaced ribs or bars 82 to which is attached a bottom 84 that tapers upwardly in both a forwardly and rearwardly direction to plate 68 as shown.

On floor plate 60 we have secured a plurality of spaced
parallel square tubing members 86 extending from front to rear and mounted therein are the respective tines 88 that project forwardly of the scoop 82. Tines 88 are secured at their rearward ends to floor 60 by bolts 90 through tubing 86. A floor extension plate 92 (FIG. 4) has sides 94 and 96 provided with flanges 98 complementary in shape with flanges 68 on sides 62 and 64 and designed to abut against and be secured thereto by bolts 100. Flanges 68 and 98 may also be provided as shown at 102. Sides 94 and 96 also include integral rearwardly extending arms 104 and 106 that rest flush on the top edge of the respective scoop sides 62 and 64 and are secured at their rearward end to the respective supports 68 by bolts 100. The edges 104 and 106 are in lowered position such arms 140 extend generally rearwardly and upwardly from shaft 122 as shown in FIG. 1. Thus operation of jack 28 will turn.

Arms 140 terminate at

4. may be necessary to adjust the combined length of arms 144 and 146 as described.

On the inner side of each rear scoop support 68 (FIGS. 9–11) there is an elongated sleeve 154 having a depending tapered flange 156 which is pivotally attached to support 68 by a pin, bolt or the like 158. For this purpose, flange 156 is provided with a plurality of vertically spaced holes 160 and support 68 is similarly provided with spaced holes 162 which are longer than for holes 160. This permits holes 160 and 162 to be registered in different combinations of whole and half hole adjustments whereby sleeve 154 can be attached to support 68 by pin 158 so as to adjust the inclination of plate 114 as shown in FIG. 3. This permits a change in the angle of each guide bar or arm 164 in relation to a second plate 114 secured to the rear side of plate 114 at each respective side thereof and extends therefrom slidable through the respective sleeves 154 where their rearward free ends are free from attachment to any other part. In this way when plate 114 is moved in a push off action (FIG. 4) sleeve members 154 serve to guide and stabilize plate 114 against any lateral twisting. To hold sleeves 154 against free pivot movement relative to supports 68 a spring means 165 connects at one end to an upwarding lip 168 on sleeve 154 and at the other end to an eye bolt 170 attached to bar 70. This permits sufficient pivotal action of sleeve 154 to prevent binding of the guide bar 164 as it moves with the pusher plate 114 and also acts on the guide bars so as to hold the edge of pusher plate portion 118 in contact with the scoop floor.

To hold the scoop assembly 20 against pivotal movement relative to beams 14 and 16 during a straight push off operation of plate 114, a bolt and nut means 172 (FIGS. 2 and 8) connects the outer side of each support 68 to the respective beams 14 and 16. Means 172 comprises a u bracket 174 open at the rear on support 68 and a bolt 176 with a clevis end 178 pivotally attached to an ear 180 on the respective beams 14 and 16. Bolt 176 is releasably engageable with bracket 174 by the lock bolts 182.

To use scoop 20 with the push off operation of plate 114 bolt means 172 is attached to bracket 174 and floor plate 69 may be used with or without extension plate 92 as required. Plate 114 is then moved by rotation of shaft 122 as described and in the rearward movement of plate 114 it will be noted that the bottom edge is turned back and up to provide a curved runner means 184 for easily riding over the forward edge of tubing 86. The deficiency of scoop 20 has been increased by providing a three sided box assembly 186 (FIGS. 6 and 7) which is attached to the forward side of plate 114 so that such plate serves as the fourth box side and floor plates 60 and 92 can serve as the bottom. This makes it possible to load the box with cement, for example, which can be deposited in any desired place or form. To do this, scoop 20 is positioned as desired and the forward movement of plate 114 will move the contents of the box forwardly until it spills over the tines 88 as the front of the box goes past this point.

Another improvement in scoop 20 is its adaptability as a dump bucket. This is accomplished by releasing bolt means 172 from bracket 174 (FIG. 8) and connecting arms 146 to the ears 152 on cross bar 70 at the top of the scoop. Also for this purpose, guide bars 164 are held against movement relative to sleeves 154 by a pin 183 which passes through hole 159 in the guide bar. Such pin 183 is attached by a chain 199 to lip 168 on each sleeve 154 as shown. This permits a change in the position, rotation of shaft 122 as described tilt assembly 20 as shown in FIG. 5 so as to dump the content thereof. Since plate 114 and guide bars 164 also tilt in this operation, pin 183 secures them to the sleeves 154 so they cannot slide forward.

Beams 14 and 16 are elevated by the hoist assemblies 24 and the location of such hoist and the direction of the
lifting force applied is important in obtaining the greatest efficiency from the applied force. The scoop 20 will rise upwardly and rearwardly and the force of the jack 54 is applied in the same relative direction with the hoist arms rising and moving rearwardly as force is applied. By this arrangement, the hoists 24 move with the scoop in the same direction rather than against the scoop as is frequently illustrated by similar devices. The net result is increased lifting power for any given power applied and makes it possible to obtain a satisfactory lifting means for the required purposes in a device of this type with a less powerful and less expensive hoist assembly.

It is submitted that the invention shown and described is aptly suited to achieve the purposes intended and is characterized by a combination of highly useful and mutually cooperating elements that combine their respective and proportionate functions in accomplishing the objects sought to be obtained.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

We claim:

1. In combination with a tractor having a pair of lifting beams pivotally connected to respective opposite sides of said tractor at the rear thereof, said beams carrying a scoop assembly on one end, a means for raising and lowering said beams, comprising an elevated support on said beams, a scissors type hoist including a pair of lifting arms pivotally secured together at one end so as to extend in a direction opposite to said scoop relative to the longitudinal axis of said tractor, the other end of one arm pivotally secured to said support, the other end of the other arm pivotally secured at the forward end of said tractor in vertical alignment over the front axle, a hydraulic jack pivotally connected at one end to the forward end of said tractor and at the other end pivotally connectible to selective spaced points on one of said arms, said jack designed to connect to a source of hydraulic power on said tractor, and the operation of said jack causing said hoist to move upwardly and rearwardly in a corresponding direction to that of the scoop.

2. In combination with a tractor having a pair of lifting beams pivotally connected respectively at opposite sides of said tractor at the rear thereof, said beams carrying a scoop assembly on one end, a means for raising and lowering said beams, comprising an inverted V-shaped frame carried by each beam so that each frame is at one respective side of the tractor engine and the apex of said frames are on a line substantially with the forward end of the tractor engine, a pair of scissors type hoists each including a pair of lifting arms pivotally secured together at one end so as to extend in a direction opposite to said scoop relative to the longitudinal axis of said tractor, the other end of one arm of each respective hoist being pivotally secured to the apex of one of said frames, the other end of the other arm of each respective hoist being pivotally secured to respective opposite sides at the forward end of said tractor, in a vertical plane over the front axle thereof, a pair of hydraulic jacks each respectively pivotally connected at one end to respective opposed sides of the forward end of said tractor in a vertical plane over the front axle thereof and at the other end respectively pivotally connectible to selective spaced points on one of said arms for selectively increasing and decreasing the speed of movement of said beams and for selectively increasing and decreasing the lifting power thereof, said jacks designed to connect to a source of hydraulic power on said tractor, and the operation of said jacks causing said hoist to move upwardly and rearwardly in a corresponding direction to that of the scoop.

3. A loader attachment for a tractor, comprising a pair of elongated spaced beams designed to straddle a tractor engine so as to project forwardly therefrom and be pivotally secured at their rearward end to respective opposite sides of the rearward end of said tractor, the forward ends of said beams adapted for attachment to a load carrying device, scissor-type hoist means operatively connected between said tractor and said beams at each respective side of the forward end of the tractor engine so that the reaction force on said hoist is carried by the front axle of said tractor, and means on said hoist for selectively increasing and decreasing the lifting power and speed of movement thereof.

4. A loader attachment for a tractor, comprising a pair of elongated spaced beams designed to straddle a tractor engine so as to project forwardly therefrom and be pivotally secured at their rearward end to respective opposite sides of the rearward end of said tractor, frame means carried by each beam intermediate the ends thereof, a hydraulically operated scissors type hoist means at each respective side of the forward end of the tractor engine and arranged to transmit a reactionary force to the front axle of said tractor, each hoist means operatively connected between said tractor and said respective frame means, and each hoist means including a hydraulic jack adjustably connected thereto at selective points to selectively increase and decrease the lifting power thereof.

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