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HYDRAULIC LIFT ATTACHMENT FOR VEHICLES

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Fig.2



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3,311,350 HYDRAULIC LIFT ATTACHMENT FOR VEHICLES Maurice M. Irwin, Rte. 4, Noblesville, Ind. 46060 Filed May 18, 1965, Ser. No. 456,671 3 Claims. (Cl. 254—132)

This invention relates to a hydraulic lift attachment for vehicles, and more particularly to a hydraulically operated attachment for farm tractors, bucket loads, bulldozers, lift trucks, and the like, which attachment may be utilized to perform a variety of lifting tasks.

Various constructions have been set forth heretofore for lifting devices of the character described, however, they have not been entirely satisfactory. 15

It is an object of this invention to provide a hydraulically operated lift attachment for farm tractors, and the like.

It is another object of this invention to provide a hydraulically operated lift attachment for tractors, or the 20 like which are provided with hydraulically operated scoops, or forks, having readily detachable scoop, or fork members thereby permitting attachment of the present device in place of the scoop, or lifting fork.

A further object of this invention is to provide a hydraulically operated lift attachment of the character described which is provided with an adjustable mounting means which greatly facilitates securing the attachment to farm tractors, bucket loaders, or the like, of varying makes and/or dimensions. 30

Still another object of this invention is to provide a hydraulically lift attachment of the character described which may be selectively adjusted so as to remain substantially level with respect to the ground regardless of the height at which the lift attachment engages the object to 35 be lifted.

Still a further object of this invention is to provide a hydraulically operated lift attachment of the character described which is further provided with connector means permitting the device of the present invention to engage 40 various implements which are utilized as an adjunct to the utilization to the device of the present invention.

A still further object of this invention is to provide a hydraulically operated lift attachment of the character described which is relatively simple and rugged in con- 45 struction.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accom- 50 panying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of the hydraulically operated lift attachment of the present invention shown adjustably secured to a farm tractor provided with a hydraulically operated, pivotally secured bucket loader, the bucket member of which has been detached to permit attachment of the present device in lieu thereof;

FIGURE 2 is an enlarged side elevational view of the device of FIGURE 1 as seen from the side opposite from 60 that seen in FIGURE 1;

FIGURE 3 is an enlarged top plan view of the device of the present invention shown secured to the support arms of the bucket loader, further showing, in broken lines, the sliding movement of a slidable portion of the 65 jaw means relative to a stationary portion of the jaw means;

FIGURE 4 is a front elevational view of the present device, further showing fragmentary portions of the support arms of the bucket loader attachment to which the device is releasably secured;

FIGURE 5 is a rear elevational view of portions of the

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present device taken substantially along the plane of the line 5-5 of FIGURE 3;

FIGURE 6 is an enlarged transverse sectional view of a portion of the relatively slidable portion of the jaw means taken substantially along the plane of the line 6-6 of FIGURE 3;

FIGURE 7 is an enlarged transverse sectional view of the fixed portion of the jaw means taken substantially along the plane of the line 7-7 of FIGURE 3;

FIGURE 8 is an enlarged sectional view taken substantially along the plane of the line 8-8 of FIGURE 3;

FIGURE 9 is a perspective view of the hydraulically operated lift attachment with a portion of the operating lever means broken away; and

FIGURE 10 is an enlarged, partially exploded, perspective view of a portion of the slidable jaw of the jaw means of the present device.

Referring now to the drawings and FIGURES 1, 2, 3 and 4 in particular, there is illustrated a hydraulically operated lift attachment indicated generally at 20 which is adjustably and releasably secured to the support means indicated generally at 22 of a bucket loader attachment, or the like, of a farm tractor 24.

The present device 20 includes a main frame member 26, which is preferably a steel channel member of an I. or H cross-sectional configuration.

As seen in FIGURE 3 for example, the main frame member 26 is preferably of greater length than the width of the support means 22 which is adjustably secured thereby allowing the device to be secured to vehicles of varying widths. The main frame member 26 is provided adjacent one end, with a vertically disposed upstanding bracket 28 which is secured to the frame member 26 by means of welding, or the like. The bracket member 28 is provided with a pair of apertures 30, 32, and a slot 33. A bracket 29 is welded to the main frame 26 on the end opposite bracket 23, and is provided with a slot 31. The slots 31 and 33 may be utilized to engage a scraper blade which may be used as an adjunct to the utilization of the present device. The bracket 28 is secured to the support means 22 of the bucket of attachment 24 by means of a pivot bolt 34 which passes through a suitable aperture in the arm 36 of the support means 22 and then through the aperture 32. The pin 34 may be secured in an assembled relationship in a conventional manner by means of a transverse detent pin passing therethrough or the end of the pin may be threaded in a suitable nut threadably secured thereon. A support arm 38, the effective length of which may be adjusted, is secured to the bracket 28 by means of a pivot pin 40 which passes through a suitable aperture in the arm 38 and then through the aperture 30 in the bracket 28. The pin 40 may be secured in its assembled relationship with regard to the bracket 28 and the arm 38 by means analogous to that securing the pin 34.

The end of the main frame 26 opposite that provided with the vertically disposed upstanding bracket 28 is provided with an adjustable bracket means indicated generally at 42 which is slidably carried by and selectively securable along a portion of the main frame member 26 adjacent the end thereof opposite that provided with the upstanding bracket member 23. The adjustable support bracket means 42 includes a U-shaped element 44 the interior dimensions of which are complementary to the exterior dimensions of the frame member 26 thereby permitting the member 24 to be slidable on the frame member 26 without the presence of any undue play. The U-shaped member 44 is secured in encompassing relationship about the frame member 25 by means of a bolt 45 which is carried in a pair of apertures 48 in the upstanding legs of the member 44. The bolt 46 is preferably supported in its assembled relationship to the member 44 by means of

a suitable nut 50 threadably received thereon. The adjustable support bracket means 42 is further provided with an upstanding bracket member 52 which is secured to the member 44 by means of welding for example. The upstanding bracket member 52 is provided with a pair of apertures 54 and 56 which are utilized to secure the bracket member 52 to the support arms 58 and 60 by means of suitable pivot bolts 62, 64 which pass through the respective apertures provided in the arms 58 and 60, the apertures 54 and 56 in the bracket 52 and are secured therein by means analogous to the means securing the pivot pins 34 and 40 of the support bracket means 28.

It may therefore be seen that with the support bracket 28 properly secured to the support arm 36, which is of the type conventionally found associated with a bucket 15 loader attachment for farm tractors, and the like it is possible to slidably adjust the upstanding bracket means 42 to compensate for differences in the distance between the support arms utilized in bucket loader devices of this type thereby permitting the attachment of the present 20 device to farm tractors, and the like, of various makes and/or dimensions. The bracket means 42 may be secured in the desired position by means of tightening the nut 50 of the bolt 56 thereby compressing the upstanding legs of the member 44 to frictionally retain the means 42 25 with respect to the main frame member 26.

A jaw means indicated generally at 70 is operatively carried by the main frame member 26, and includes a fixed jaw member 72, which is secured to the frame member 26 by means of welding, for example. As seen best 30 in FIGURE 7, the fixed jaw member 72 is preferably formed from a section of I-beam, the cross-sectional configuration of which is the same as the channel member from which the main frame 26 is fabricated. The jaw means 70 further includes a slidable jaw means 74 which 35 includes a jaw member 76 which is slidably carried by the main frame member 26 by virtue of the fact that the jaw member 76 is provided with a pair of sliding support plates 78 and 80 which are secured to the top and bottom of the jaw member 76 by welding, for example. The jaw 40 member 76 and its integral plates 73 and 89 are slidably retained upon the frame member 26 by means of a Ushaped channel member 32 which is secured, in the position best seen in FIGURE 6, by means of a pair of bolts 84 which pass through suitable apertures in the plate 73, member 82 and plate 80 and are secured therein by means of threadably received nuts 36, for example. It will be understood of course that when the nuts 86 of the bolts 84 are tightened, the member 82 acts as a spacer to prevent the plates 78 and 80 from compressing thereby as-50suring that the slidable jaw means 74 is freely slidable longitudinally of the frame member 26. An additional spacer member 88 is provided adjacent the outside corner of the plates 78 and 80 to assure that the slidable jaw means 74 tracks in a parallel relationship with regard to 55 the frame member 26 when a turning moment is applied to the forward portion of the jaw member 76.

The sliding jaw means 74 is reciprocated longitudinally of the main frame member 26 by means of a double acting hydraulic cylinder 90 and its associated linkage means which includes the lever 92 and its associated link 94. As seen best in FIGURES 3 and 9, one end of the hydraulic cylinder 90 is pivotally secured to a mounting bracket 96 by means of a pivot pin bolt 98, or the like. The mounting bracket 96 is secured to the main frame 26 by The reciprocating shaft 100 of the hydraulic welding. cylinder 90 is pivotally connected to the lever 92 for rotation about the axis provided by a pivot pin 102 which is carried in suitable apertures in top and bottom of the main frame member 26. As seen best in FIGURE 9, the main frame member 26 is slotted adjacent the end carrying the pivot pin 102 to permit oscillatory movement of the lever 92 about the vertical axis provided by the pin 102. The operating link 94 is in turn pivotally secured to the lever 92 outwardly and forwardly of the main 75

frame member 26. The other end of the operating link 94 is pivotally journalled about a pivot pin 104 which is carried in suitable apertures 196 and 108 provided in the sliding jaw means 74. As seen best in FIGURE 4, the operating link 94 is preferably journalled to the pivot pin

104 by welding the lever to a spacer bushing 95. Although not shown, it will be understood that the hydraulic hoses, or lines 91 and 93 are connected in a conventional manner to a hydraulic pump and control system carried by the farm tractor, bucket loader, or the like. Accordingly, it may be seen that when fluid pressure is applied through line 91, for example, to the hydraulic cylinder 90 urging the shaft 100 from the full line position the broken line position shown in FIGURE 3, the lever 92 and its operating link 94 will urge the slidable jaw means 94 from a spaced apart relationship with regard to the stationary jaw means 72 to an engaging relationship wherein the pole, tree, posts, or the like being operated upon, may be grippingly engaged. To retract the jaws, it is merely necessary to reverse the flow of the hydraulic fluid into the double-acting hydraulic cylinder 90 through the hydraulic line 93, for example, to return the shaft 100, lever 90, line 94 to the full line position as shown in FIGURE 3.

The jaw members 72 and 76 are preferably provided with camming surfaces 73 and 77 thereby assuring that when a vehicle utilizing the hydraulically operated attachment 20 engages a post, or the like, that the object will be cammed, or guided, into the jaw space defined between the jaw members 72 and 76.

As seen best in FIGURE 9, the jaw members 72 and 76 are further provided wth serrated portions 75 and 79 on their upper, inwardly facing edges to facilitate the gripping of the object being operated upon. It will also be noted that the lower inwardly facing edges of the jaw means 72 and 76 are preferably not serrated as at 75 and 79 so that when the lift attachment 20 grippingly engages a post, or the like by closing the slidable jaw means 74 as described above, and the hydraulic system of the vehicle is actuated to raise the boom 22 vertically. To lift the object being gripped, it will be understood that there will be a tendency for the lower inwardly facing portions of the jaw members 72 and 76 to slide horizontally across the object being gripped and accordingly the lower portions of the jaw members 72 and 76 are left unserrated 45 so as not to tear the object being lifted.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination, a hydraulic lift attachment adapted to be removably mounted on spaced apart vertically swingable hydraulically actuated parallel boom members interconnected with a central hydraulic system of a tractor or the like, a transverse frame means provided with 60 means removably securing said transverse frame means to respective parallel boom members adjacent their ends, jaw means carried by said transverse frame means and extending outwardly therefrom, said jaw means including a pair of substantially parallel jaw members, one of said 65 jaw members being rigidly secured to said transverse frame means intermediate the ends thereof, the other of said jaw members being provided with means slidably supporting the jaw member on said transverse frame means for rectilinear sliding movement toward and away 70from said fixed jaw member, said jaw members being maintained in generally parallel relationship during opening and closing thereof, a double-action hydraulic cylinder having one end pivotally secured to said transverse frame means between said fixed jaw member and one end

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of said transverse frame means, said hydraulic cylinder being pivotally secured to said frame means inwardly thereof, said slidable jaw member being carried by said transverse frame means on the portion between the fixed jaw member and the end of the frame means opposite from that to which said cylinder is pivotally secured, means operatively connecting the operating piston of said cylinder to said rectilinearly slidable jaw member whereby the slidable jaw may be selectively reciprocated to grippingly engage an object to be lifted by said lift at-10 tachment, said operating piston connecting means including means operatively connecting the operating piston of said cylinder to said slidably mounted jaw member to selectively impart a sliding movement thereto, said connecting means including a lever pivotally journalled about 15 a vertical axis carried by said transverse frame means, said pivoted lever having one end pivotally journalled to the operating piston of said hydraulic cylinder, a pivot pin carried by said slidable jaw, an operating link having one end pivotally journalled about said pivot carried by 20said slidable jaw, said operating link having its other end pivotally journalled to said pivoted lever outwardly of said pivot carried by said transverse frame means.

2. In combination, a hydraulic lift attachment adapted to be removably mounted on spaced apart vertically 25 swingable hydraulically actuated parallel boom members interconnected with a central hydraulic system of a tractor or the like, a transverse frame means provided with means removably securing said transverse frame means to respective parallel boom members adjacent their ends, 30 jaw means carried by said transverse frame means and extending outwardly therefrom, said jaw means including a pair of substantially parallel jaw members, one of said jaw members being rigidly secured to said transverse frame means, the other of said jaw members being provided with means slidably supporting the jaw member on said transverse frame means for sliding movement toward and away from said fixed jaw member, a double-action hydraulic cylinder pivotally secured to said transverse frame means inwardly thereof, means operatively connecting the operating piston of said cylinder to said slidably mounted jaw member to grippingly engage an object to be lifted by said lift attachment, said means removably securing said transverse frame means to the respective parallel boom members including a pair of up- 45 lifted by said lift attachment. standing support brackets carried by said transverse frame means, one of said upstanding brackets being rigidly secured to one end of said transverse frame means, the other of said upstanding brackets being 50provided with means slidably supporting the bracket on said transverse frame adjacent the end opposite that provided with said fixed upstanding bracket, said slidably mounted upstanding bracket being further provided with

means for selectively positioning said slidable bracket with regard to said transverse frame means, said upstanding support brackets each being provided with at least one pair of apertures in the upstanding portion above said transverse frame means, one aperture in each upstanding bracket being utilized to pivotally secure said bracket to the respective parallel boom members, the other pair of apertures being utilized to pivotally secure said brackets, control arms operatively associated with the parallel boom members to selectively pivot the lift attachment about the axis provided by said pivotal connection to said parallel boom members.

3. In combination, a hydraulic lift attachment adapted to be removably mounted on spaced apart vertically swingable hydraulically actuated parallel boom members interconnected with the central hydraulic system of a tractor or the like, a transverse frame means provided with means removably securing said transverse frame means to respective parallel boom members adjacent their ends, jaws means carried by said transverse frame means and extending horizontally outwardly therefrom, said jaw means including a pair of substantially parallel jaw members, one of said jaw members being rigidly secured to said transverse frame means, the other of said jaw members being provided with means for slidably supporting the jaw members on said transverse frame means for sliding movement toward and away from said fixed jaw members, said pair of jaw members each having a vertically disposed generally I-shaped cross-sectional configuration comprising upper and lower spaced apart horizontally disposed portions connected by a vertically disposed web, said generally I-shaped jaw members being serrated on the opposed contiguous gripping surfaces of said upper horizontally disposed portions to assist in retaining an object to be lifted by said lift attachment, the opposed contiguous surfaces of said lower horizontally disposed portions being non-serrated whereby damage to an article being lifted will be minimized as the gripping surface of the jaws pivots with respect to the article being gripped a double-action hydraulic cylinder pivotally secured to said transverse frame means inwardly thereof, means operatively connected the operating piston of said cylinder to said slidably mounted jaw member to impart a sliding movement thereto to grippingly engage an object to be

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