Aug. 20, 1929. H. F. LESSMANN 1,725,201

LOADING ATTACHMENT FOR TRACTORS

Original Filed Feb. 3, 1926 4 Sheets-Sheet 1

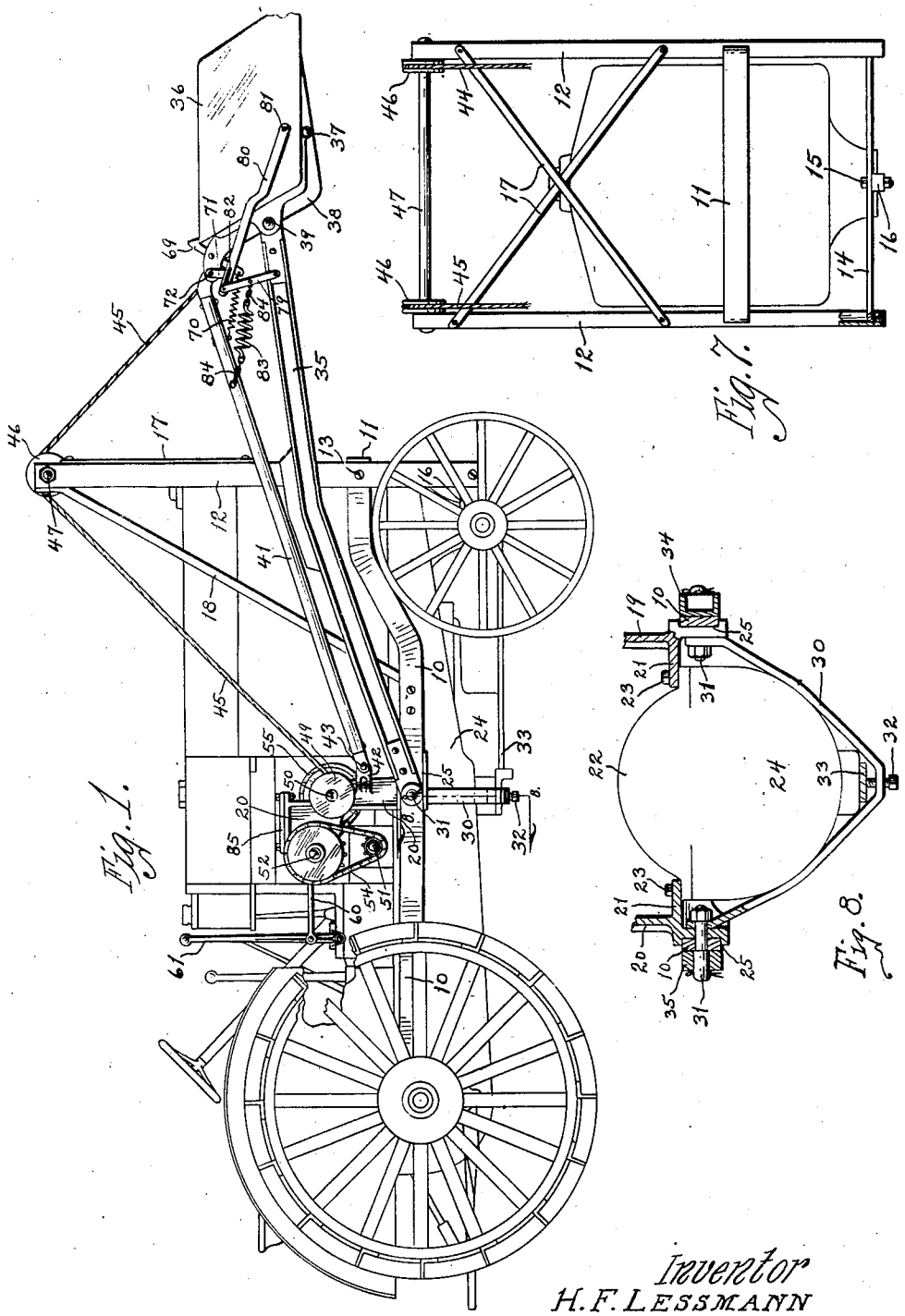

Fig. 1.

Fig. 7.

Fig. 8.

Inventor
H. F. LESSMANN

by Earl M. Sinclair Atty.

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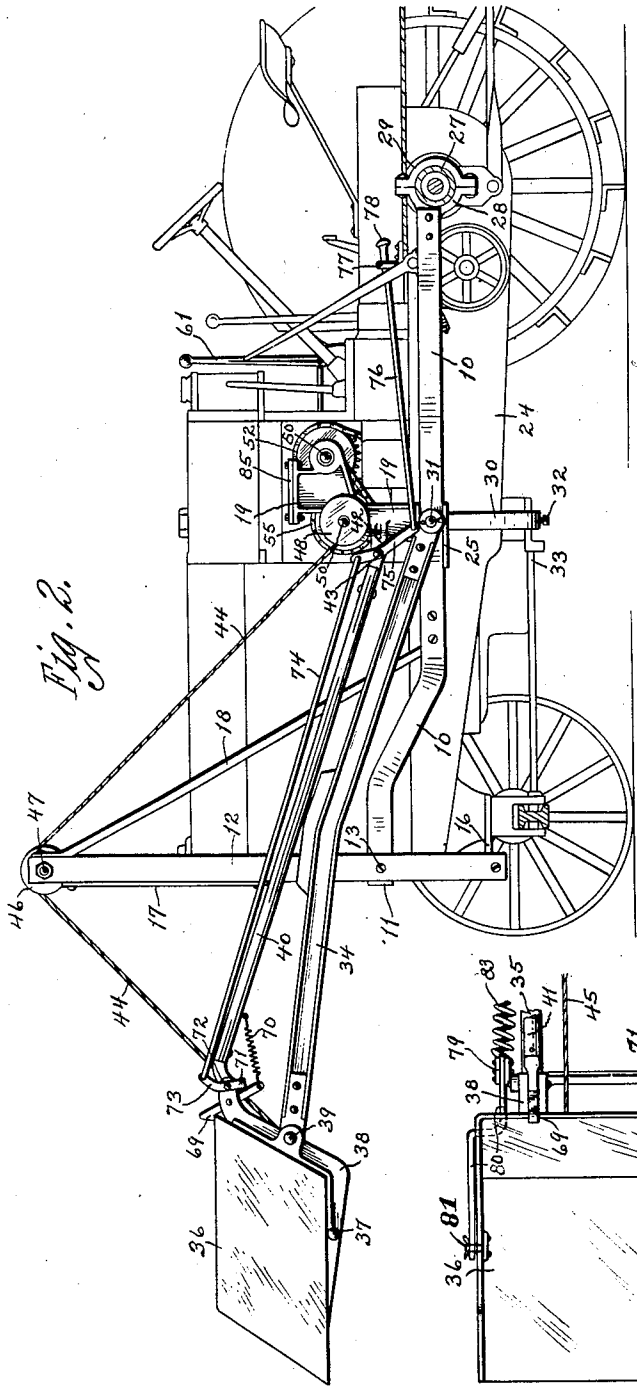

Fig. 2.

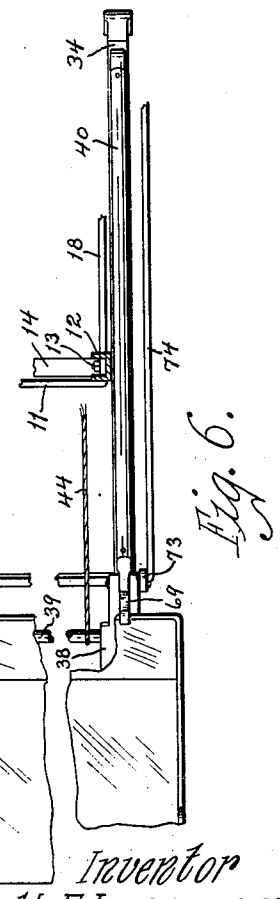

Fig. 6.

Inventor
H. F. LESSMANN

by Earl M. Sinclair Atty.

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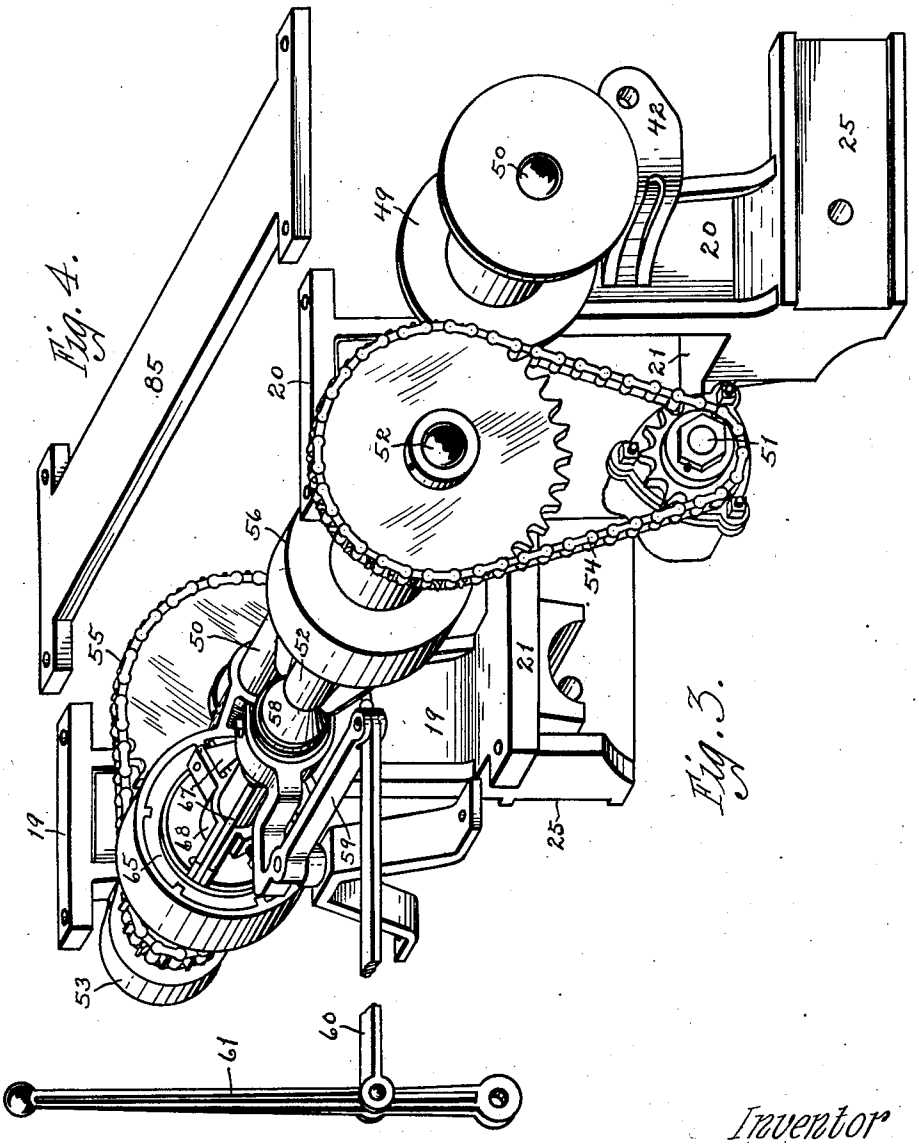

Fig. 4.

Fig. 3.

Inventor
H. F. LESSMANN

by Earl M. Sinclair Atty.

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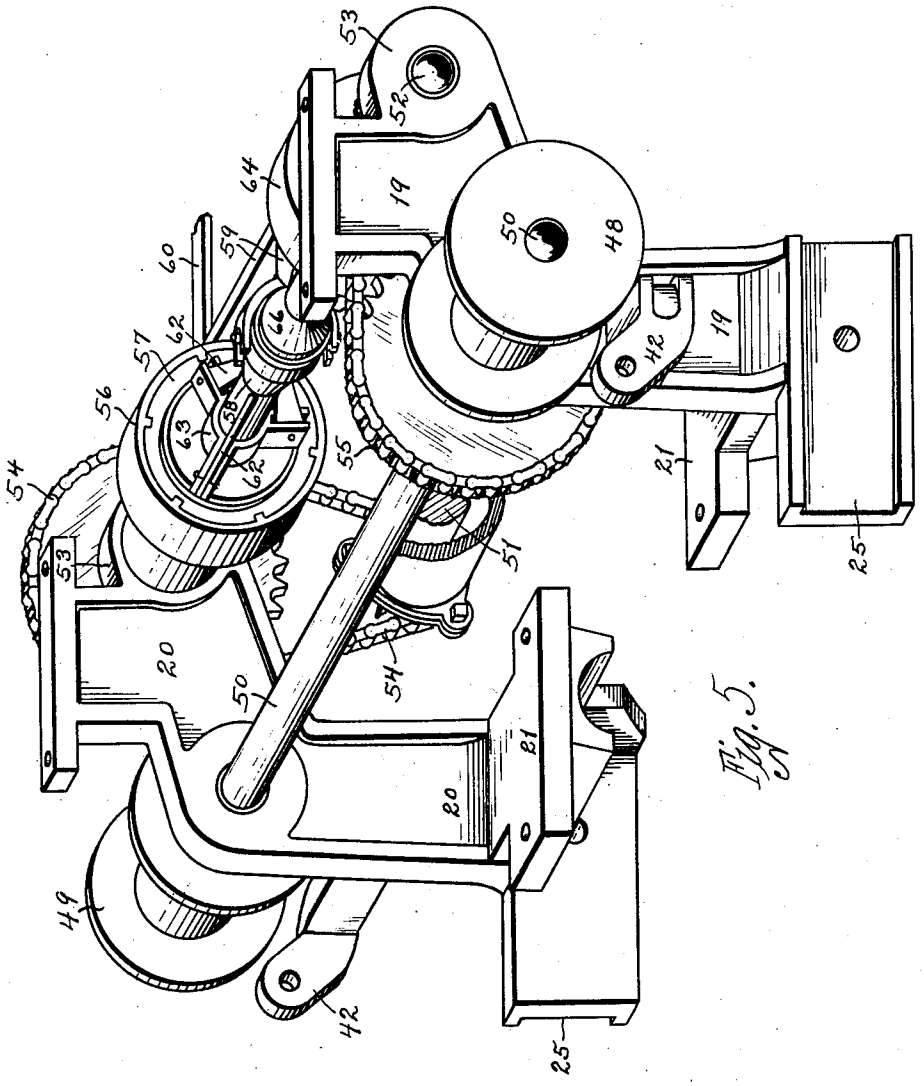

Fig. 5.

Inventor
H. F. LESSMANN

by Earl M. Sinclair Atty.

Patented Aug. 20, 1929.

1,725,201

UNITED STATES PATENT OFFICE.

HERBERT F. LESSMANN, OF DES MOINES, IOWA.

LOADING ATTACHMENT FOR TRACTORS.

Application filed February 3, 1926, Serial No. 85,666. Renewed July 18, 1928.

This invention relates to improvements in hoisting and loading devices and more particularly to a simple and inexpensive attachment for tractors, whereby the latter may carry a loading scoop or the like and operate the same by power.

A further object is to provide an attachment of the character set forth which is quickly applicable to and removable from the well known McCormick-Deering tractor without the necessity of making any extensive alterations in the tractor construction, novel provision being made whereby the operating mechanism for the loading scoop, fork or the like, is driven from the usual power take-off shaft of the tractor.

A still further object is to provide a loading attachment of the character described which may be easily operated by the person driving the tractor, all controls being located within easy reach of the driver's seat.

Another object is to provide improved and novel means for mounting the loader frame on the tractor.

Yet another object is to make novel provision for holding the loading scoop or the like against tilting until the load is raised to the required point and for then permitting it to dump.

A still further object is to provide improved means for returning the scoop to loading position after it has been dumped and the lifting arms are again lowered.

With these and other objects in view, my invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in the claims and illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation showing my improved attachment mounted on a McCormick-Deering tractor.

Figure 2 is an opposite side elevation of the same.

Figure 3 is a perspective view of the operating mechanism by which power is taken from the power-take-off shaft of the tractor.

Figure 4 is a perspective view showing the top plate which has been removed from the parts shown in Figure 3.

Figure 5 is a perspective view of the operating mechanism taken from a different angle than Figure 3.

Figure 6 is a plan view showing portions of the scoop and its latching and releasing means.

Figure 7 is a front view, partly in section, showing the forward part of the loading frame and its attachment to the tractor.

Figure 8 is a view, partly in section on the line 8—8 of Figure 1, showing the means for attaching the central portion of the loading frame to the tractor.

In the accompanying drawings I have illustrated the preferred form of my attachment, which form has been successfully constructed and operated, but it will be understood that the several improvements are not restricted to the exact details disclosed. Furthermore, although I have shown the machine equipped with a scoop, it will be understood that a platform, fork or other equivalent device may be substituted for said scoop to permit use of the loading attachment for any desired purpose. Hence, the word "scoop" appearing hereinafter is to be construed accordingly.

The loading attachment includes a main base frame which is adapted to be detachably secured to a tractor for the purpose of carrying all parts of the hoisting mechanism and its operating means. In the present showing this frame is designed for use upon a McCormick-Deering tractor, but it might be shaped and adapted for application to other machines. In the construction here illustrated, the frame includes a pair of side bars 10, 10 integrally connected at their forward ends by a cross-bar 11, extending across the front of the tractor, said side bars being offset upwardly between their rear and forward ends to clear the forward wheels of the tractor. Posts 12, 12 are spaced apart at the forward end of the machine and preferably are formed of channel bars opening inwardly and being notched on their inner faces to receive forward portions of the side bars 10, 10, to which they are secured as by means of screws or bolts 13. The posts 12, 12 extend above and below the plane of the side bars 10, 10 and their lower ends are connected by a cross member 14 which is secured by a bolt 15 at its center to a member 16 projecting forwardly from the front axle of the tractor. Upper portions of the posts 12, 12 are connected by

crossed braces 17, which occupy a place just in front of the radiator of the tractor. The upper ends of the posts 12, 12 are also provided with braces 18, 18 which extend rearwardly and downwardly to intermediate portions of the side bars 10, 10. Brackets 19 and 20 are mounted on opposite sides of the rear portion of the motor of the tractor, and each of said brackets is formed at its lower end with an inward projection 21 adapted to rest on the flanged transmission case cover 22 and be secured thereto by bolts 23 which are a trifle longer than and are substituted for the bolts which are ordinarily employed to secure said cover to the case 24. On their outer faces the brackets 19 and 20 are formed with longitudinally channeled seats 25 to receive intermediate portions of the side bars 10 and 10 which are secured thereto by bolts 31. The side bars 10, 10 extend beyond the brackets 19 and 20 and are provided at their rear ends with any suitable means for detachably connecting to the rear axle 27 of the tractor. In this instance the bars 10, 10 are provided at their rear ends with half-bearings 28 (Fig. 2) to which are bolted or otherwise secured cooperating half-bearings 29, said half-bearings embracing the axle 27. A yoke 30 embraces the crank case 24 and has its ends secured against the inner faces of the brackets 19 and 20 by the bolts 31, and a set screw 32 is threaded through the central portion of the yoke and engages the rear end of the radius rod 33 of the tractor near its point of attachment to the crank case. By tightening the set screw 32 the yoke 30 may be tightened around the crank case to assist in holding the base frame securely in position on the tractor.

A pair of upwardly swinging scoop arms 34 and 35 are pivoted at their rear ends on the bolts 31, which bolts are shouldered as shown in Figure 8 to permit free pivotal movement and at the same time securely clamp the other members which they engage. The numeral 36 designates a scoop carried by the forward ends of the arms 34 and 35 and in the present showing, this scoop is pivoted at 37 on a pair of substantially L-shaped scoop rests 38, the latter being in turn pivoted at 39 to the arms 34 and 35. A pair of stabilizing links 40 and 41 are provided, which are pivoted at their rear ends to ears 42 formed on and extending forwardly of the brackets 19, and 20, whereby the pivots 43 of said links are located above and forwardly of the pivots of the lifting arms. It thus follows that when the arms 34 and 35 are raised and lowered, the stabilizing links 40 and 41, which are substantially parallel therewith, serve to always retain the scoop rests 38 in such position as to prevent undesirable tilting of the scoop 36 and, in fact really serve to somewhat elevate the forward end of the scoop as it is raised, owing to the fact that the links are shorter than the arms and their pivots 43 arranged forwardly of the vertical plane of the pivots 31 of said arms.

The pivots 39 of the scoop to the scoop rests constitute a transversely extending bar as shown in Figure 6, and to this bar are fixed cables 44 and 45 which are extended upwardly and over cable guides 46 carried at the upper ends of the posts 12 by a shaft or spindle 47. The cables 44 and 45 thence extend rearwardly and downwardly and are adapted to be wound on drums 48 and 49 fixed to a shaft 50 journaled in the brackets 19 and 20. The shaft 50 is adapted to be driven from the power take-off shaft 51 of the tractor, by means about to be described, for the purpose of raising the lifting arms and the scoop through draft on the cables 44 and 45. A counter shaft 52 is journaled in bearings 53 carried by the brackets 19 and 20 and is arranged transversely of the mechanism and above the take-off shaft 51. to which it is operatively connected by sprocket gearing 54, in such manner as to reduce the speed of the countershaft. The countershaft 52 is also operatively connected to the drum shaft 50 by further speed-reducing sprocket gearing designated by the numeral 55. The countershaft 52 is divided and means is provided for clutching its two parts together to communicate motion from the power shaft to the drum shaft, including a drum 56 secured to one member of the shaft and containing disks 57 feathered to the other member of the shaft in the ordinary manner and adapted to be compressed by a cone 58 slidably mounted and adapted to be operated by a bell-crank lever 59, link 60 and hand lever 61. The cone engages fingers 62 pivoted on a frame 63 and when so moved the fingers apply pressure to the disks to cause a frictional engagement to clutch the two members of the shaft together. Similar braking means is provided to slacken the descent of the scoop after it has been dumped and the disk clutch means released, said braking means including a drum 64 loosely mounted on the follower portion of the countershaft 52 and suitably held against rotation, and containing a plurality of disks 65 feathered to the shaft and adapted to be compressed within the drum to retard or prevent the rotation of the shaft. The operating means in this instance is a cone 66 opposite to the cone 58 and fixed thereto and adapted to engage fingers 67 pivoted on a frame 68 for engagement with the disks 65. Thus both the clutch and brake have a common operating lever means, movable in one direction to apply the clutch and in the opposite direction to apply the brake.

To normally hold the scoop against dump-

ing, but to permit it to tilt forwardly and dump when desired, I provide a pair of latches 69 which are preferably pivoted between their ends to the upper ends of the scoop rests 38 to engage the upper edge of the back of the scoop 36. Coil springs 70 preferably are used to apply the latches 69, connecting the lower ends of said latches and adjacent points on the lifting arms. For releasing the latches I have provided a latch-releasing bar 71 which extends transversely at the rear of the latches and has upwardly turned ends pivoted to the scoop rests 38 at the same pivots 72 which connect the stabilizing arms or links 40 and 41 thereto. One end of the bar 71 extends upwardly beyond its pivot 72 to form a lever 73 and this lever is connected by a link 74 with the upper end of a lever 75 fulcrumed between its ends on the pivot 43 of the rear end of the link 40. The lower end of the lever 75 is pivotally connected to a reciprocating rod 76 slidable in a bearing 77 and having on its rear end a foot member 78 engageable by a foot of the operator of the tractor. Pressure upon the rod 76 through the pedal 78 causes an oscillation of the lever 75 and rearward draft upon the link 74, which rocks the lever 73 and moves the latch-releasing bar 71 forwardly against the lower ends of the latches 69, thereby disengaging said latches from the scoop 36 and permitting the latter to dump upon its pivots 37 by force of gravity.

For again righting the scoop after it has been dumped, I make novel provision shown particularly in Figure 1, the means for this purpose operating automatically as the lifting arms and members connected therewith are returned to position for loading. The numeral 79 designates a lever fulcrumed at its lower end on the lifting arm 35 at a point somewhat to the rear of the pivot 39 of the scoop rest. A crooked link 80 is pivoted at one end at the point 81 to the side wall of the scoop 36, somewhat above and forwardly of its pivot 37 to the scoop rest; and said link extends upwardly and rearwardly and is slotted at its rear end at 82 for a sliding pivotal connection to the upper end of the lever 79. Between its ends the lever 79 is provided with a flexible, resilient connection to a point rearwardly on the adjacent stabilizing link 41, such connection preferably including a relatively heavy coil spring 83 having sections of chain 84 at its ends by which the connections are made to the lever and link. When the scoop is dumped the pivot 81 of the returning link 80 passes below the pivot 37 of the scoop, and the forward movement of said link stores power in the spring 83. As the scoop is lowered by release of draft on the cables, under control of the brake mechanism, the pivot 37 of the scoop finally passes below the pivot 81, owing to the altered positions of the members which are pivotally connected, and then the spring 83 acts through the lever 79 and link 80 to return the scoop to closed position by a snap action which causes the latches 69 to again engage the scoop and hold it in position for another filling operation.

The upper ends of the brackets 19 and 20 are connected rigidly by a plate 85 mounted on and bolted to them, which plate also serves to partially cover the operating mechanism connected with the power take-off shaft 51, countershaft 52 and drum shaft 50.

It will be noted that all the controls for the operation of the apparatus are simple and conveniently located for manipulation from the driver's seat of the tractor. Also that the attachment is easily applied and requires no changing of the tractor mechanism or frame.

I claim as my invention—

1. The combination with a tractor having a transmission case with a cover, and a transverse power take-off shaft, of a pair of brackets carried by and rising from the transmission case cover, a countershaft and a drum shaft journaled in said brackets parallel with and operatively connected to said power take-off shaft, side frame bars receiving the body of the tractor therebetween and connected at their rear ends detachably to the rear axle of said tractor, said brackets being formed with longitudinally channeled seats to receive intermediate portions of said side frame bars, lifting arms pivoted on said side frame bars, a pivoted scoop carried by the forward ends of said lifting arms, and cables fixed to the forward ends of said lifting arms and adapted to be wound on said drum shaft.

2. The combination with a tractor having a transverse power take-off shaft, of a pair of brackets carried by and rising from the tractor frame, a pair of side frame bars arranged on opposite sides of the tractor body and having detachable connections at their rear ends to the rear axle of the tractor, hoisting mechanism carried by said side frame bars, a countershaft journaled in said brackets and having a gearing connection with said power take-off shaft, a drum shaft journaled in said brackets and having a gearing connection with said countershaft, cables fixed to said hoisting mechanism and adapted to be wound on said drum shaft, and a yoke bolted at its ends to said brackets and extending under and in embracing relation to the crank case of the tractor.

3. The combination with a tractor having a transverse power take-off shaft, of brackets fixed to and rising from side portions of the tractor, side frame bars mounted on opposite sides of the tractor body, hoisting mechanism carried by said side frame bars and brackets and having operative connections

with said power take-off shaft, a yoke fixed at its ends to said brackets and extending under and in bracing relations with the crank case of the tractor, and a set screw threaded in the central portion of said yoke and adapted for engagement with a portion of the tractor body.

4. A hoisting mechanism comprising a frame, a vertically swinging lifting arm pivoted thereon, a pivoted scoop carried by the free end of said arm, releasable means for normally holding said scoop from dumping, a lever fulcrumed to said arm adjacent said scoop, a tension means connected with said lever, and a link pivotally connecting said lever with said scoop, the pivot of said link to the scoop adapted to move past the pivot of the scoop to its support when the scoop is dumped to store power in said tension member.

5. A hoisting mechanism comprising a frame, a vertically swinging lifting arm pivoted thereon, a pivoted scoop carried by the free end of said arm, releasable means for normally holding said scoop from dumping, a lever fulcrumed to said arm adjacent said scoop, a tension means connected with said lever, and a link pivoted at one end to the scoop and at its other end having a sliding pivotal connection with said lever, the pivot of the link to said scoop adapted to move past the pivot of the scoop to its support when the scoop is dumped to store power in said tension means, said tension means acting automatically to restore said scoop to its normal position as said lifting arm is lowered.

6. In combination with a tractor having a driving engine thereon, a U-shaped main frame having its side bars positioned along the sides of the tractor and having its connecting member positioned along the front of the tractor, the free ends of said side bars being connected to the tractor, and members mounted upon said tractor at the rear of the driving engine and having inwardly extending parts adapted to be secured to the tractor and having parts formed with longitudinally channeled seats to receive the side bars of the main frame.

7. In combination with a tractor having a driving engine thereon, a main frame having its side bars positioned along the sides of the tractor and having a connecting bar secured to the forward ends of the side bars and extending across the front of the tractor, means for connecting the rear ends of the side bars to the axle of the tractor, and members positioned upon the tractor rearwardly of the driving engine and having on their outer faces longitudinally extending recesses adapted to receive portions of the side bars.

8. In combination with a tractor having a driving engine thereon, a main frame having side bars positioned along the sides of the tractor and having a connecting bar secured to the forward ends of the side bars and extending across the front of the tractor, means for connecting the rear ends of the side bars to the axle of the tractor and a support positioned upon the tractor rearwardly of the driving engine having downwardly projecting arms provided with longitudinally extending recesses for snugly receiving portions of the side bars within the recesses.

9. In combination with a tractor having a driving engine thereon, a main frame having side bars mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to engage portions of the side bars and be secured thereto whereby the frame is supported between its forward and rear ends upon the tractor by said support and said side bars are braced between their ends against movement towards each other and a boom pivotally connected to the side members at a point where the strain of the boom on the side bars will be transmitted to the support.

10. In combination with a tractor having a driving engine thereon, a main frame mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to engage portions of the main frame and be secured thereto whereby the frame is supported between its forward and rear ends upon the tractor by said support, a boom, means for pivotally mounting said boom on said frame, said means serving to connect said frame with said support.

11. In combination with a tractor having a driving engine thereon, a main frame having side bars mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to engage portions of the side bars and be secured thereto whereby the frame is supported between its forward and rear ends upon the tractor by said support and said side bars are braced between their ends against movement towards each other and a boom pivotally connected to the side members at a point where the strain of the boom on the side bars will be transmitted to the support, said main frame having a cross bar adapted to extend in front of the tractor and be secured to said side bars.

12. In combination with a tractor having a driving engine thereon, a main frame mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to be positioned adjacent the main frame and means of connection therebetween whereby the frame is

supported between its forward and rear ends upon the tractor by said support, a boom, means for pivotally mounting said boom on said frame at a point where the strain of said boom will be transmitted to the connection between the frame and the support.

13. In combination with a tractor having a driving engine thereon, a main frame mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to engage portions of the main frame and be secured thereto whereby the frame is supported between its forward and rear ends upon the tractor by said support, a boom, means for pivotally mounting said boom on said frame, at a point where the strain of said boom on the frame will be directly transmitted to said support, a hoisting mechanism upon said support, means for operatively connecting said hoisting mechanism with the driving engine of said tractor and cables for connecting said hoisting mechanism with said boom.

14. In combination with a tractor having a driving engine thereon, a main frame mounted at a plurality of points upon said tractor and a support resting upon the tractor rearwardly of the driving engine and having parts adapted to engage portions of the main frame and be secured thereto by means of shouldered bolts, whereby the frame is supported between its forward and rear ends upon the tractor by said support, enlarged portions of said bolts beyond the shoulders thereof forming a pivotal connection for a crane boom.

15. In combination with a tractor having a driving engine thereon, a U-shaped main frame having its side bars positioned along the sides of the tractor and having its connecting member positioned along the front of the tractor, the free ends of said side bars being secured to the rear axle of the tractor, and a support mounted upon said tractor having downwardly extending parts adapted to be secured to the side bars of the main frame by means of shouldered bolts having the shoulders thereof engaging said side bars, a crane boom pivoted on said main frame, the enlarged portions of said bolts beyond the shoulders thereof providing pivots for said boom, a hoisting mechanism mounted on said support operable from said engine and having operative connection with said boom for causing its pivotal movement on said bolts.

16. In combination with a tractor having a driving engine thereon, a U-shaped main frame having its side bars positioned along the sides of the tractor and having its connecting member positioned along the front of the tractor, and members bolted to the frame of the tractor at the rear of the driving engine and extending outwardly from the transmission case and secured to the side bars of the main frame for supporting the latter relative to the tractor.

17. In combination with a tractor having a driving engine thereon, a U-shaped main frame having its side bars positioned along the sides of the tractor and connected thereto adjacent their rear ends, said main frame having its connecting member positioned along the front of the tractor, an upright frame connected to the front of the tractor and to the side bars of the main frame, and members mounted on the frame of the tractor at the rear of the driving engine and secured to the side bars of the main frame for supporting the latter intermediate its ends relative to the tractor.

18. A hoisting attachment for tractors comprising a bridge-like structure adapted to span and to be fastened down upon the transmission case of the tractor and including side brackets, a hoist shaft journaled in said brackets and operatively connected to the power plant of the tractor, and a boom pivotally attached to said brackets and projecting forwardly of the tractor and operatively connected with said shaft.

19. The combination with a tractor having an engine, transmission mechanism, a housing therefor, and a power take-off shaft associated with said mechanism, of hoisting mechanism mounted across the transmission housing in rear of the engine and operatively connected with the power take-off shaft, clutch and brake means for controlling the operation of said hoisting mechanism, a frame including side bars fixed adjacent the sides of the tractor and a front bar connecting the forward ends of the side bars and extending across the front of the tractor, a boom pivotally connected to said side bars and projecting forwardly of the tractor, and operative connections between said boom and said hoisting mechanism.

HERBERT F. LESSMANN.