

Sept. 10, 1946.

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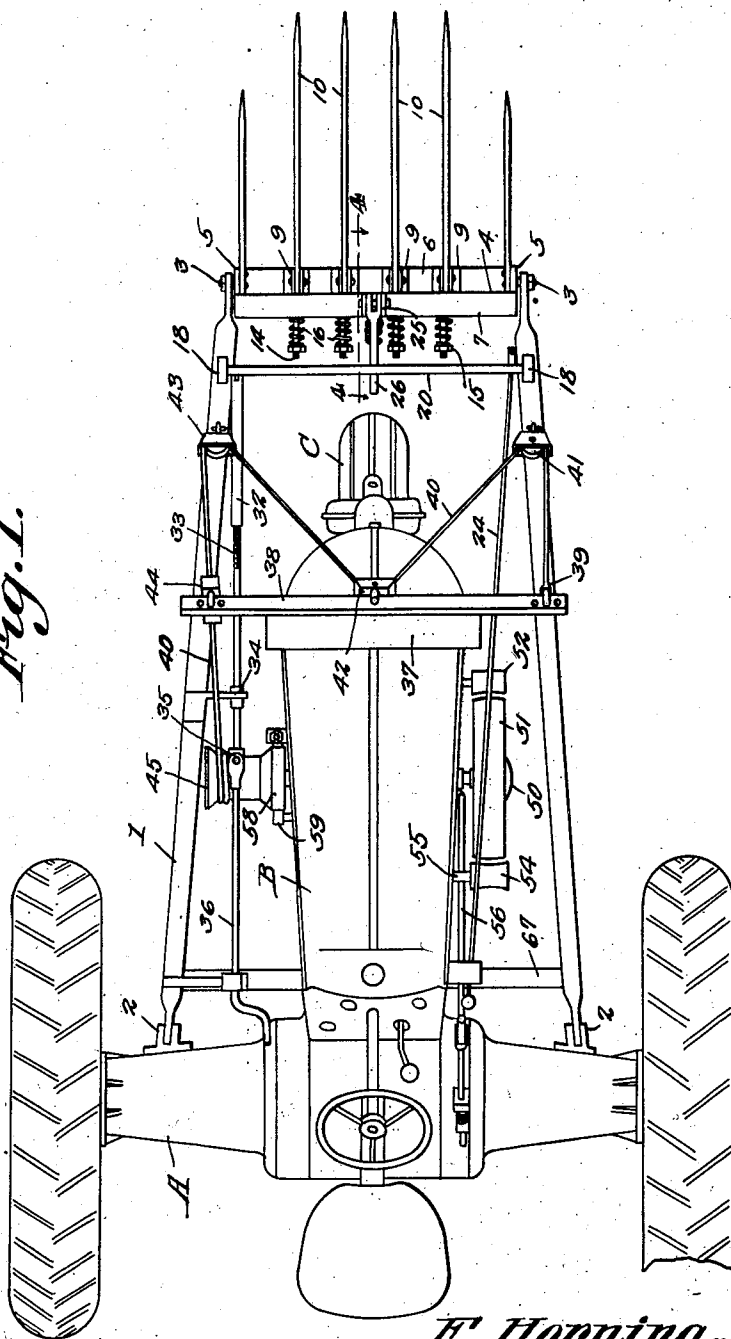
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MATERIAL HANDLING ATTACHMENT FOR TRACTORS

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Fig. 1.



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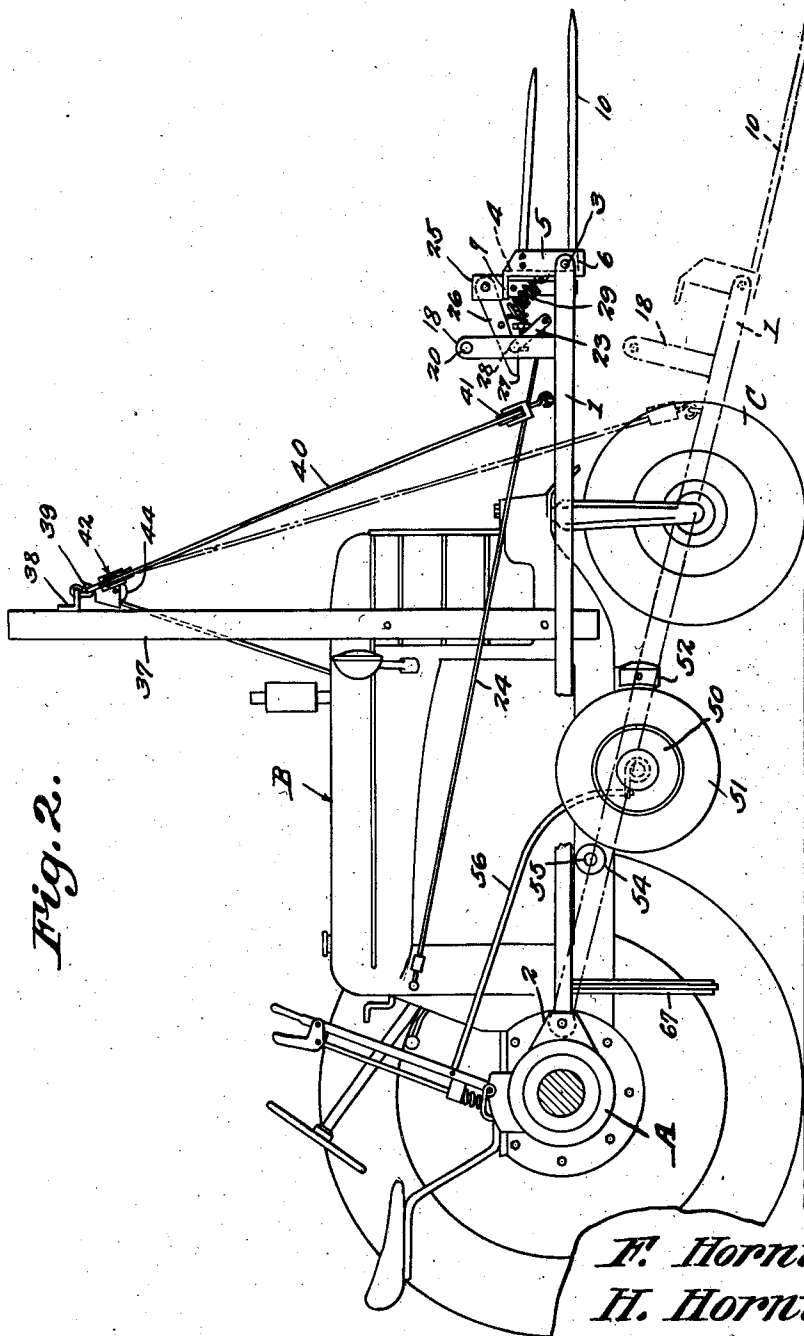
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MATERIAL HANDLING ATTACHMENT FOR TRACTORS

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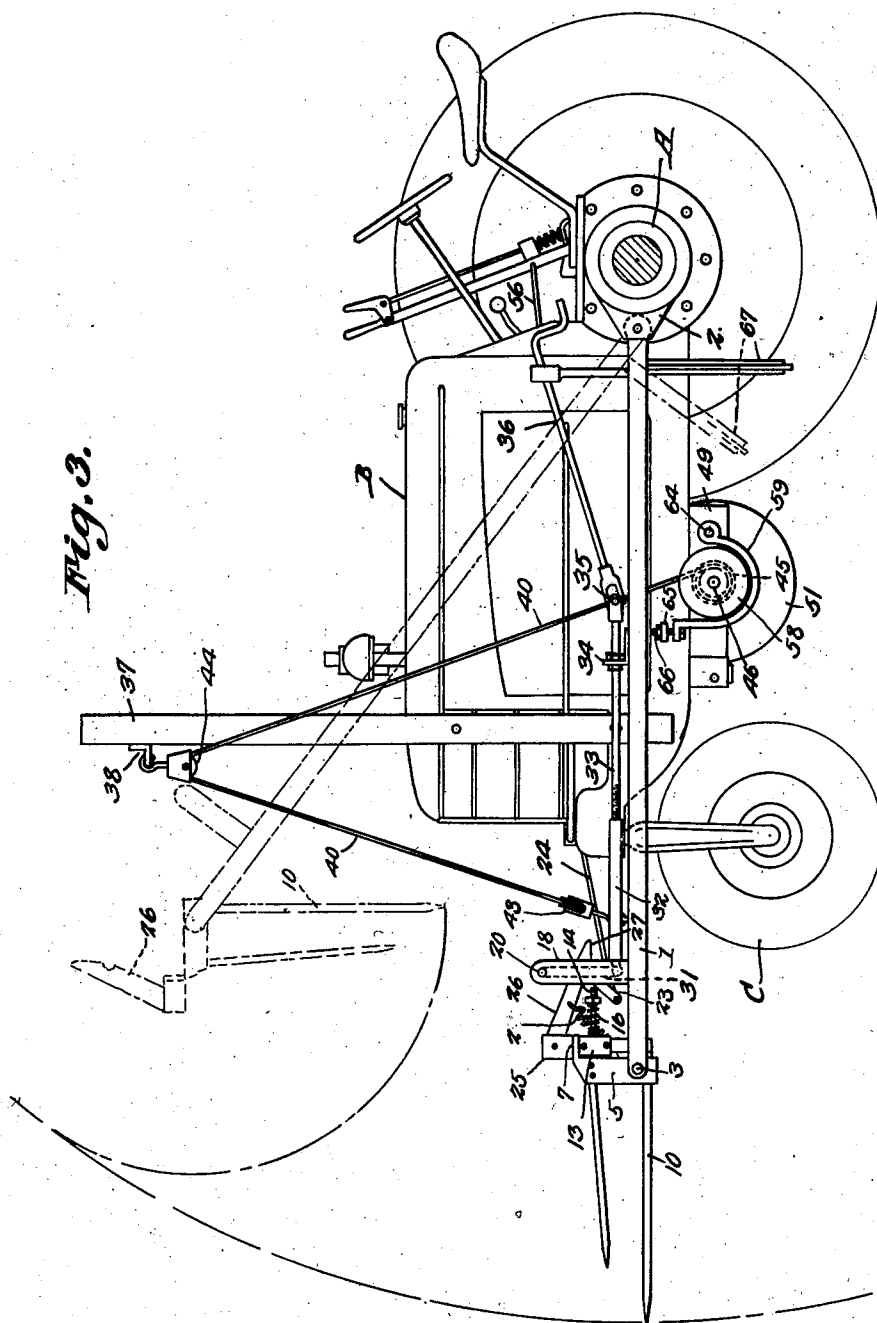
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MATERIAL HANDLING ATTACHMENT FOR TRACTORS

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Fig. 3.



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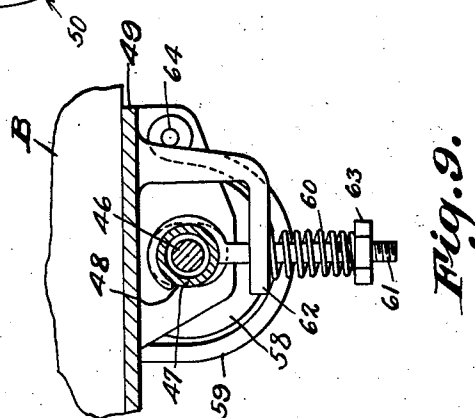
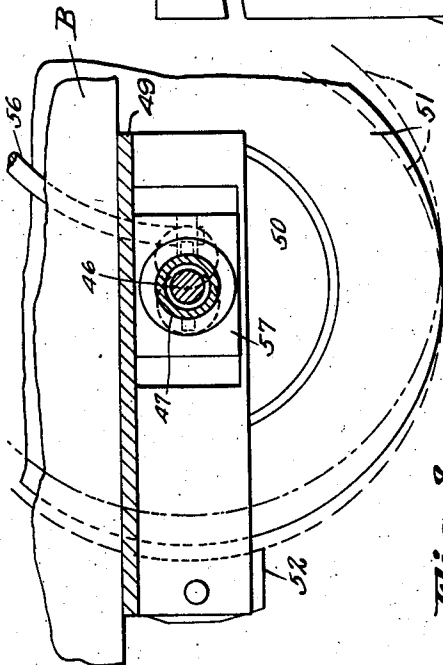
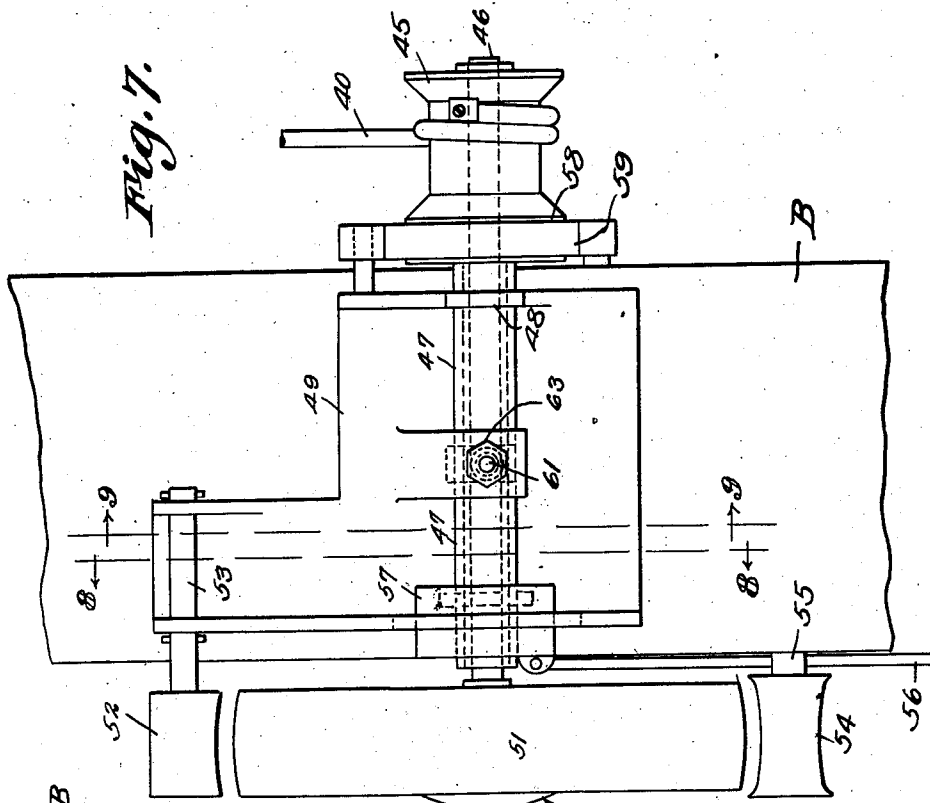
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MATERIAL HANDLING ATTACHMENT FOR TRACTORS

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5 Sheets-Sheet 5



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MATERIAL HANDLING ATTACHMENT
FOR TRACTORSFrancis Horning and Howard Horning,
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Application July 18, 1945, Serial No. 605,708

1 Claim. (Cl. 214—140)

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This invention relates to an attachment for tractors whereby various kinds of material can be handled readily for loading, etc. The invention is especially useful for loading manure, hay, etc.

An object of the invention is to provide a simple and efficient attachment which can be applied readily to the main axle housing of the tractor and is supported astride the front portion of the tractor, there being a material engaging head tiltably connected to a lifting frame and having means by which the head can be released for unloading the material.

A still further object is to provide a material engaging head which can be adjusted angularly to any desired position relative to its supporting frame, the position of the head relative to its supporting frame being adjustable readily and being held by a latching mechanism of new and novel construction through which the adjustment is effected.

A still further object is to provide new and novel means for actuating the frame at the will of the operator.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawings, the preferred form of the invention has been shown:

In said drawings,

Figure 1 is a top plan view of a tractor equipped with the present improvement.

Figure 2 is a side elevation, parts being broken away, one of the positions of the attachment being indicated by broken lines and another position being indicated by full lines.

Figure 3 is a view similar to Figure 2 illustrating the opposite side of the structure, two positions of the attachment being indicated, one by broken lines and one by full lines.

Figure 4 is a section through a portion of the head and illustrating its latching and adjusting means partly in section and partly in elevation, said section being taken substantially on the line 4—4, Figure 1.

Figure 5 is an enlarged section on line 5—5, Figure 4.

Figure 6 is an enlarged section on line 6—6, Figure 4.

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Figure 7 is a bottom plan view of a portion of the tractor and showing the portion of the operating mechanism joined thereto.

Figure 8 is a section on line 8—8, Figure 7.

Figure 9 is a section on line 9—9, Figure 7.

Referring to the figures by characters of reference, A designates the rear or main axle housing of a tractor, the body portion of which has been indicated at B and supported at the forward end by one or more wheels C as ordinarily.

The present invention comprises a frame made up of forwardly converging side beams 1, the rear ends of which are hingedly connected to brackets 2 which are secured in any suitable manner to the axle housing A.

Supported between the forward ends of the side beams and joined thereto by aligned pivot pins 3 or the like is the material engaging head which, in the present instance, is formed of a transverse plate 4 having side flanges 5, a forwardly extended bottom flange 6 and a rearwardly extended top flange 7.

Slots 8 are formed in the lower portion of the plate 4 and are preferably parallel and regularly spaced. Located on the bottom flange 6 adjacent to each of these slots are brackets 9 which can be arranged in pairs and pivotally mounted between the brackets of each pair is a prong 10 of any suitable length, the rear portion of which is extended backwardly through the adjacent slots. The lower link of a toggle 11 is pivotally connected to the rear end portion of the prong and the upper link of the toggle is pivotally connected to a bracket 12 extending backwardly from the upper portion of the plate 4. As shown particularly in Figure 6, the upper link of the toggle is formed of a channeled member 13 which embraces the bracket 12. A pin 14 is pivotally connected to the bracket and extended loosely through the channeled member 13 of the toggle and this pin has an adjustable nut 15 constituting means for receiving thrust from a coiled spring 16 which bears against the channeled member 13 and serves normally to resist swinging movement of the member 13 relative to the bracket 12. It will be noted that the pivotal connection between the two links of the toggle is out of a dead center, as shown at 17. Thus under ordinary loads, the toggle and the spring will serve to hold the prong 10 against downward swinging movement to the position indicated by broken lines in Figure 4. However, when the prong is subjected to an excessive load which might break the parts, the upward pressure against the toggle exerted by the rear end

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of the prong will be sufficient to break the joint in the toggle and place the spring 16 under compression. Thus the toggle will fold and allow the prong to drop downwardly until such time as it is relieved of its load, whereupon it will move back to its initial position. Any desired number of these prongs will be used and each of them will be equipped with the same type of safety means.

Obviously, instead of providing prongs, a shovel structure could be used which would operate upon the same principle.

Standards 18 are fixedly joined to the side beams 1 back of the plate 4 and at these points, the frame can be reinforced by cross bar 19. A transverse shaft 20 is journaled in the standards and carries depending brackets 21 supporting a latch bar 22. This latch bar is rotatably mounted in the brackets 21 and is provided with a crank arm 23 to which a pull rod 24 or the like can be connected, thus providing an operating means which extends to a point where it can be reached readily by the operator of the tractor.

Mounted on a bracket 25 extending upwardly from the top flange 7 is a pivoted latch 26 having a tapered head 27 at its free end leading to a notch 28 formed in the bottom edge of the latch. Normally the latch bar 22 is seated in this notch as shown particularly in Figures 4 and 5 and the latch is held pressed against the bar 22 by a coiled spring 29 attached at one end to the latch and at its other end to the plate 4.

The latch bar 22 has a fin 30 extending radially therefrom at a point below the latch. This fin constitutes a latch lifting element and is normally out of contact with the latch, as shown in Figures 4 and 5. However, when the bar 22 is locked by pulling on crank arm 23, the fin 30 will swing against the head of the latch 26 and lift it out of engagement with the bar 22 with the result that plate 4 thus is free to swing forwardly and downwardly about its pivotal connections 3 so as to dump any load which might be carried thereby and by the prongs or other devices extending therefrom. As soon as the latch bar 22 is returned to its normal position, the head 27 will drop back into engagement with the latch bar so that the parts thus will become reset. The downward movement of the released latch 26 is limited by the flange 7 and the bracket 25 thereon so that when the parts are returned to their initial positions, the latch will be properly guided into engagement with the latch bar 22.

The transverse shaft 20 has an arm 31 extending therefrom to which is pivotally connected a tubular shaft section 32 into which is extended a screw threaded shaft section 33 loosely mounted in a bearing 34 carried by one of the side beams 1. This shaft section 33 is connected by a universal joint 35 to an operating crank shaft 36 or the like extended to a point where it can be reached and actuated readily by the operator of the tractor. Thus when the shaft 36 is rotated, shaft section 33, which is held against longitudinal movement in its bearing, will move the tubular shaft section 32 forwardly or backwardly, depending on the direction of rotation of shaft 33 with the result that shaft 20 will be rocked backwardly or forwardly so that motion will be transmitted through the latch bar 22 to latch 26 with the result that the head formed of plate 4 and the parts connected thereto, will be adjusted angularly about its pivotal connection, the position of the head will be maintained with reference to the side beams 1 until

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another adjustment is obtained. Thus the head can be quickly set to bring the load supporting elements into position at the correct angle prior to the operation of the mechanism. To release the head so that the load can be dumped, it becomes merely necessary to rock the latch bar 22 so as to cause fin 30 to press upwardly against the latch 26 and disengage it from the latch bar. Importance is attached to the fact that the latching mechanism constitutes an essential part of the head adjusting mechanism, motion being transmitted to the head during the adjustment thereof through the latch and latch bar. The latching mechanism will operate efficiently no matter to what angle the head may be adjusted relative to the side beams.

For the purpose of raising and lowering the side beams and the load engaging structure carried thereby, there is provided an upwardly extended frame 37 which preferably bridges the forward portion of the tractor and is fixedly joined to the sides thereof. The width of this frame is less than that of the swinging frame heretofore described, and connected to the upper portion of the frame is a cross beam 38 to one end of which is joined one end of a hoist cable as indicated at 39, this cable, 40, being extended downwardly from the point of connection 39 under a pulley 41 connected to one of the side beams 1; thence upwardly over a pulley 42 connected to the center of the beam 38 thence downwardly under a pulley 43 connected to the other side beam 1 and thence upwardly over a pulley 44 connected to the other end of the beam 38. From this latter pulley the cable 40 is extended back to a winding drum or windlass 45 secured to one end portion of a transverse shaft 46. This shaft is journaled in a bearing member 47 which is pivotally mounted adjacent to its center as indicated at 48, the pivot element being extended from a plate 49 or the like which is secured to the bottom of the tractor. A friction wheel 50 is secured to the other end of shaft 46 and carries a pneumatic tire 51. This wheel is located between a brake shoe 52 supported by an arm 53 extended laterally from the plate 49 and a drive wheel 54 carried by the power take-off shaft 55 of the tractor. The drive wheel 54, which is a friction element, and the shoe 52 are normally spaced from the tire 51 mounted on the wheel 50 so that under ordinary conditions the take off shaft 55 and its friction wheel 50 can operate without driving the shaft 46. However, by actuating a rod 56 connected to a slidable bearing 57 in which shaft 46 is journaled, said shaft can be given a slight tilting movement backwardly or forwardly, thereby to bring the tread of the tire 51 into contact either with the drive wheel 54 or with the brake shoe 52. Should it be brought into contact with the rotating wheel 54, motion will be transmitted to the wheel 50 and, through shaft 46 to the windlass 45 which thus would operate to wind the cable thereon.

Secured to the shaft 46 at a point adjacent to the windlass 45 is a friction disk 58 and extending under this disk is a friction band 59. Shaft 46 is capable of a slight up or down movement within its bearing 47 but this movement is normally resisted by a spring 60 carried by a stem 61 which is slidably mounted in a bracket 62 and is connected to the bearing member 47 as shown particularly in Figure 9. This spring 60 exerts a constant downward thrust against a nut 63 or the like carried by stem 61 so that

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the friction disk 58 thus is held pressed yieldingly against the band 59 which is pivotally anchored at one end as shown at 64. Its other end is adjustably connected to a bracket 65 by means of a bolt 66.

After the head of the attachment has been adjusted to a predetermined angle as before explained, and with the latch 26 in engagement with bar 22, the frame made up of the beams 1 can be lowered by moving the friction wheel 50 to its intermediate or neutral position so that the weight of the load carrying head will cause the beams to swing downwardly and the cable 40 to unwind from the windlass 45. As long as there is no pulling strain on the cable 40, the friction disk 58 will remain in wiping contact with band 59 so that the shaft 46 will not spin after the cable is relieved of the weight of its load.

With the load carrying head lowered to the desired position following adjustment to the predetermined angle, the tractor is moved forwardly so as to force said head into engagement with the material to be lifted. After a load has been moved onto the head the shaft 46 is shifted to bring the tire 51 into contact with the wheel 54. Thus shaft 46 is revolved at a reduced speed and the windlass is caused to wind the cable 40 thereupon. Because of the arrangement of pulleys and cable loops, this will result in an upward swinging movement of the loaded head and after it has been brought to a desired elevation the shaft 46 is abruptly shifted to bring tire 51 into contact with the stationary brake shoe 52. Thus the shaft 46 is held against rotation and the cable cannot unwind therefrom. Obviously, during the application of a load to the cable, said cable serves to pull the friction disk 58 upwardly from the friction band 59.

The tractor can be moved to the point of delivery and when that point is reached, the operator pulls on the releasing or unlatching rod 24. This causes the latch bar 22 to partly rotate with the result that the fin 30 comes against the head of latch 26 and lifts the latch out of engagement with said bar. Consequently, the head will swing downwardly and dump its contents. The tractor is then brought back for reloading and by bringing the wheel 50 to its intermediate position, shaft 46 will be free to rotate rapidly under the weight of the load engaging head and the descending beams 1, thereby causing the

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cable to unwind from the windlass. Spinning of this windlass, however, will be prevented by frictional contact of the disk 58 with the band 59 which are brought together by the spring 60 as soon as the windlass is relieved of the pull from the cable. Upon arrival of the head in contact with the ground, it will automatically swing into reset position where it will be secured by its latch. The tractor can then be driven forwardly to force the head into the material to be loaded whereupon the foregoing operation will be repeated.

As before stated, the angle of the head relative to the side beams 1 can be varied at will simply by rotating the sectional shaft formed of the parts 32, 33 and 36.

By providing a pneumatic tire to form the friction surface of the friction wheel 50, a very efficient working connection between the wheel 54 and wheel 50 is afforded and frequent replacements of these friction surfaces becomes unnecessary.

It is preferred to strengthen the rear portion of the frame formed by the beams 1 and their connections by utilizing a rear cross bar 67 rigidly secured to the side beams and preferably in the form of a depending yoke extending transversely beneath the rear portion of the tractor.

What is claimed is:

The combination with a tractor or the like, of a frame mounted for up and down swinging movement relative thereto, said frame being extended forwardly beyond and to the sides of the tractor, a material engaging head carried by the frame, and means for raising and lowering the frame relative to the tractor, said means including a motor driven shaft having a friction wheel, a brake shoe spaced from the shaft, a transverse shaft mounted for up and down and back and forth swinging movement, a friction wheel on said shaft, a tire carried by the friction wheel and constituting a friction tread, said wheel and tire being interposed between and normally out of contact with the shoe and the wheel on the motor driven shaft, means for shifting said transverse shaft to position its friction wheel in contact with either the brake shoe or the wheel on the motor driven shaft, a windlass on the transverse shaft, and means actuated by the windlass for raising and lowering the frame relative to the tractor.

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