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3,342,357

SELF-LOADING SKIDDER AND STACKER

Filed Oct. 13, 1965

3 Sheets-Sheet 1

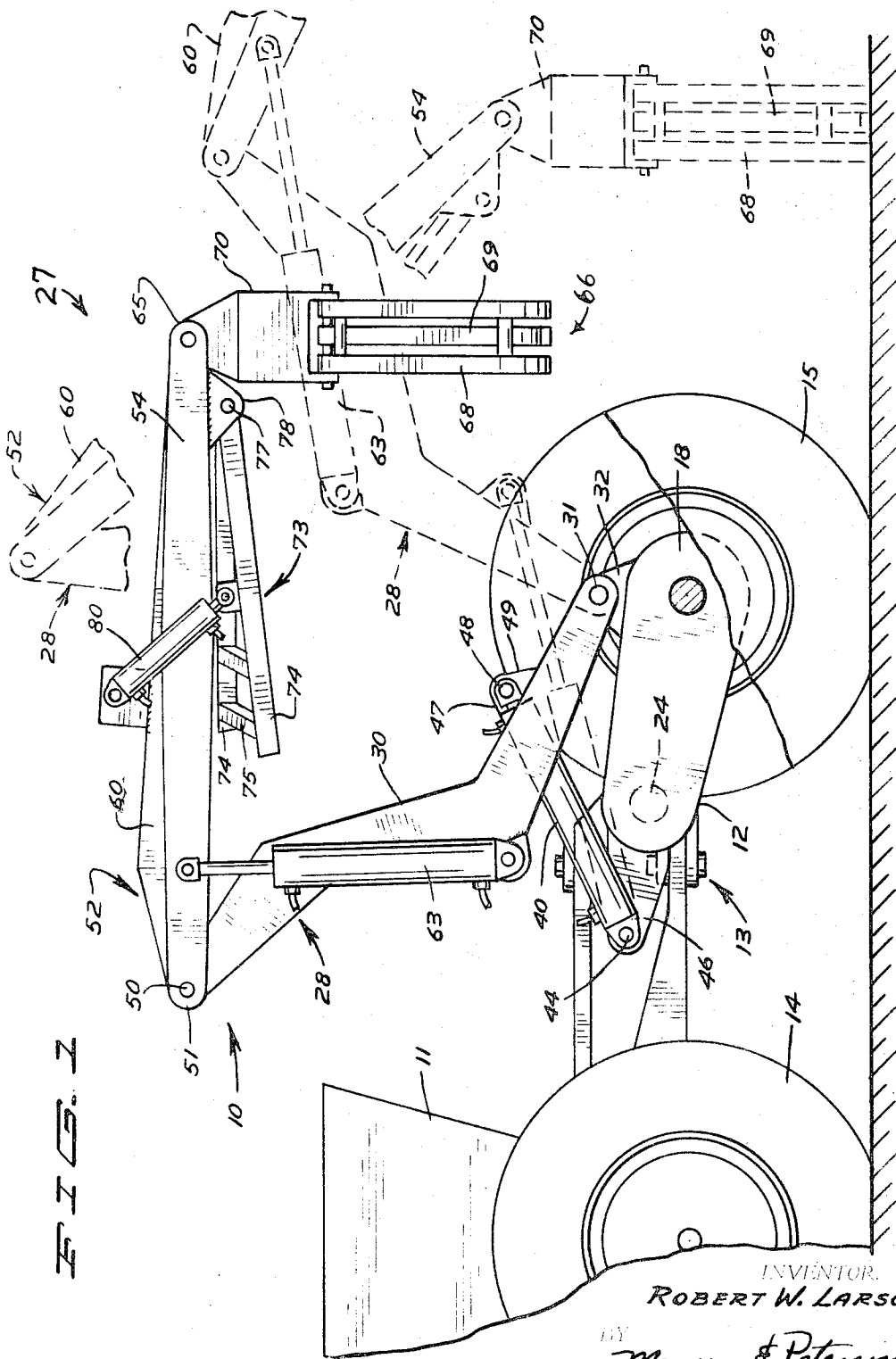


FIG. 1

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FIG. 2

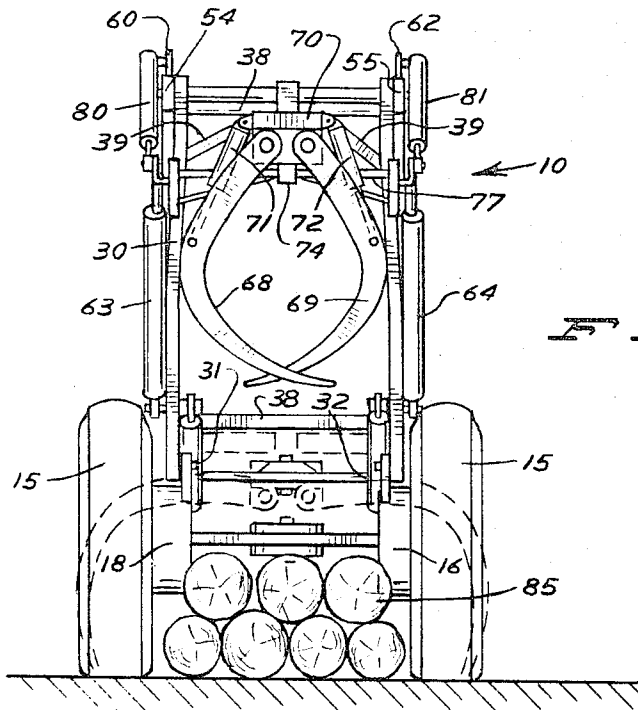
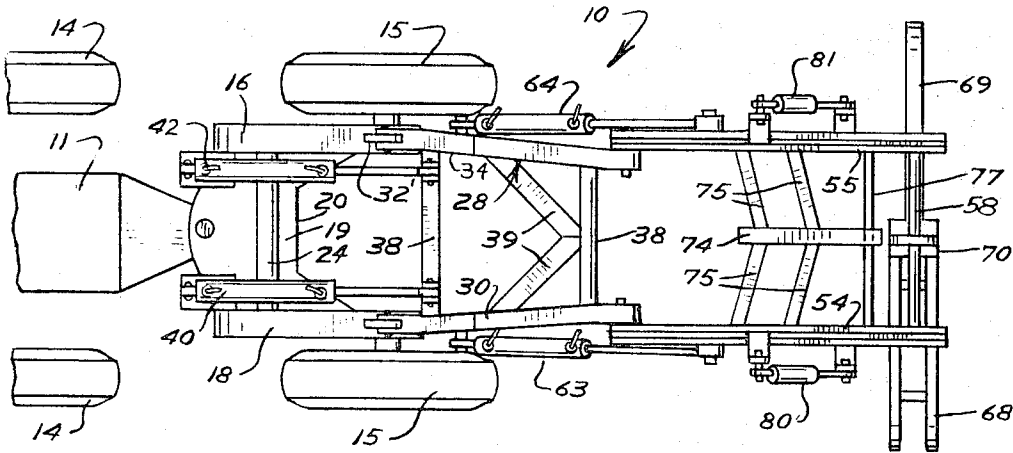


FIG. 3

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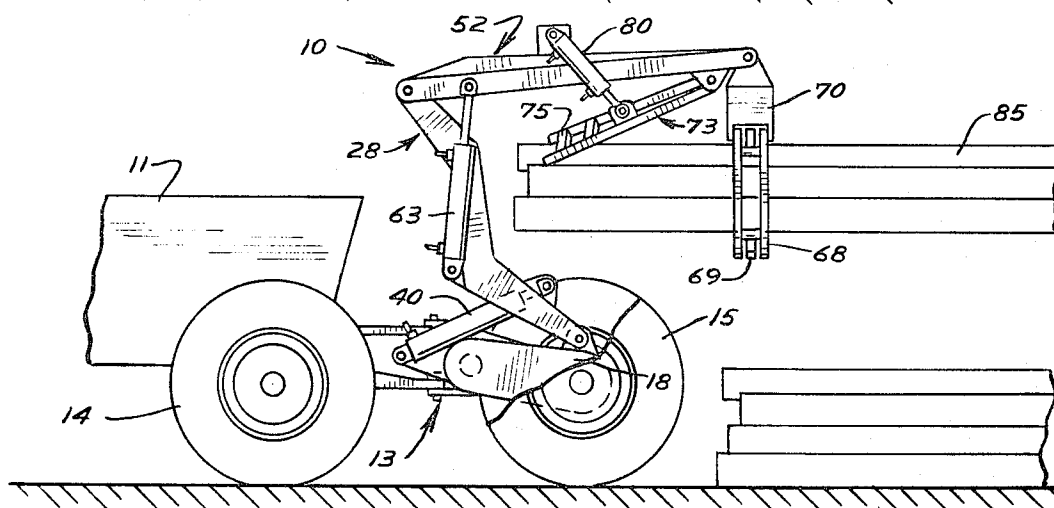
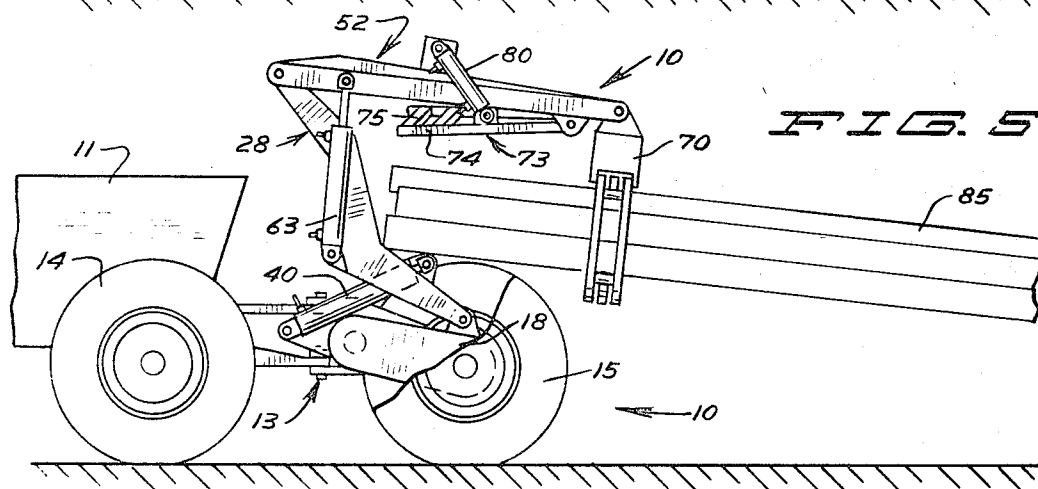
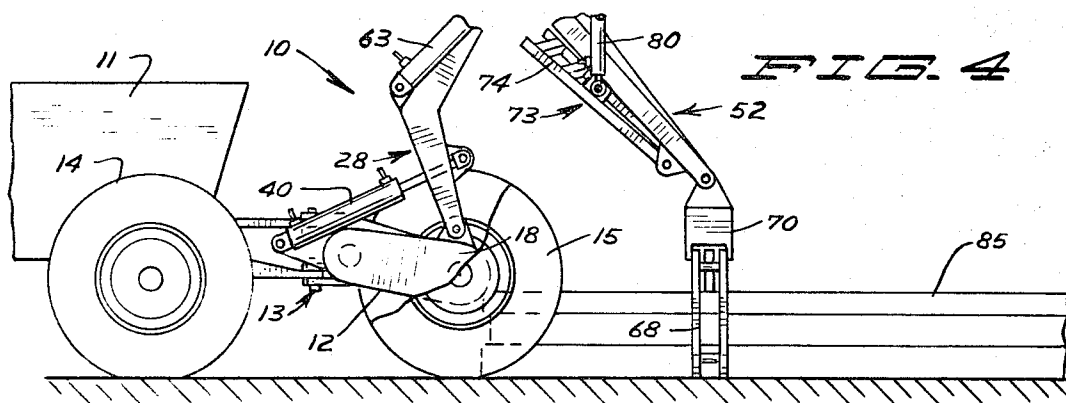


FIG. 6

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SELF-LOADING SKIDDER AND STACKER

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1 Claim. (Cl. 214-147)

This invention relates to a self-loading log handling vehicle having an improved boom and grapple mechanism. More particularly, the invention relates to a highly maneuverable log handling vehicle capable of efficiently skidding a bunch of logs from one location to another and stacking the bunch when desired.

In modern logging operations, it is often necessary to transport logs over substantial distances from the place where they are cut to another place in the forest over terrain which is impassable to conventional vehicles such as trucks and the like. Special vehicles called skidders are ordinarily used to move the logs to a place which can be reached by conventional vehicles, and at that location, the logs are either loaded for transport to the mill or are placed on storage stacks until they are needed.

It is an object of this invention to provide a log handling vehicle having a high degree of maneuverability and being capable of loading itself with a bunch of logs from a temporary storage stack or windrow, skidding the bunch to a second location, and there loading the bunch either directly on a truck or the like or on another stack.

It is another object of the invention to provide a log manipulating machine having a hydraulically actuated heel boom arrangement which is capable of a wide range of movement so that logs can be skidded and loaded more quickly and easily, and thus more economically, than with prior art log handling machines.

It is still another object of the invention to provide a novel boom arrangement for a log handling vehicle which can be extended to pick up a bunch of logs from the ground and retracted to draw the end of the bunch of logs up over the vehicle to place the load squarely thereon for skidding and to bring the load closer to the vehicle when the logs are picked up completely in a stacking operation.

Other objects, advantages and new features of the invention will become apparent from a reading of the following detailed description, in conjunction with the accompanying drawings in which:

FIGURE 1 is a side elevational view of a preferred embodiment of a log handling machine according to the present invention showing, in phantom outline, some alternative positions of the boom and grapple structure;

FIGURE 2 is a top plan view of the present log handling machine;

FIGURE 3 is a front elevational view of the machine with the log grapple shown in solid lines in the skidding or stacking positions thereof, and in phantom outline in the self-loading position;

FIGURE 4 is a side elevation showing the grapple in position to engage a bunch of logs on the ground;

FIGURE 5 is a view similar to FIGURE 4 but showing the machine with its boom in the skidding position; and

FIGURE 6 is a similar view showing the parts in their stacking relation.

In the illustrated embodiment of the invention, the log handling vehicle is generally designated by reference numeral 10 throughout the several views. Vehicle 10 is articulated so that it is quite maneuverable through the woods and consists of a forward two-wheeled tractor portion 11 and a rearward two-wheeled trailer portion 12, pivotally connected together as generally indicated at 13. It will be understood that the tractor portion 11 carries a suitable engine for driving the front wheels 14 for propel-

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ling the machine and for powering the hydraulic equipment on the trailer 12.

Trailer 12 has a pair of rear wheels 15 journaled in suitable supports 16 and 18 fixed to the frame 19 of trailer 12. It will be noted in FIGURE 2 that frame 19 is recessed or cut back as indicated at 20 so that the wheels 15 may be brought into straddling relation to a bunch of logs. A transverse brace 24 may also form part of frame 19.

For carrying out the log handling functions of the machine, a boom and grapple structure 27 is mounted on trailer 12. Structure 27 includes a main boom frame 28, mounted on trailer 12 for rotation about a horizontal axis. Main boom frame 28 has a right boom leg 30 pivotally attached by means of a pin 31 to a lug 32 fixed to wheel support 18 as seen in FIGURE 1 and a parallel left boom leg 34 is attached in the same manner by a pin and lug 32' (FIG. 2) to wheel support 16. Boom legs 30 and 34 are transversely joined and braced as by transverse beams 38 and braces 39 to complete the structure of main boom frame 28.

A pair of double acting hydraulic motors 40 and 42 of conventional structure are provided to move main boom frame 28 about the axis of its supporting pins. Here, as elsewhere, the hydraulic lines to the motors have been omitted for clarity. As shown in FIGURE 1, hydraulic motor 40 has its cylinder 43 pivotally anchored by means of a pin 44 on a suitable lug 46 secured to frame 19. The extension rod 47 of motor 40 is pivotally attached to boom leg 30 by means of a pin 48 and a lug 49 on one of the transverse beams 38. Motor 42 is similarly connected on the left side of the machine so that simultaneous actuation of motors 40 and 42 will swing main boom frame 28 about its horizontal axis. It will be noted in FIGURE 1 that the anchor point for the hydraulic motors is located well to the left of the pivot axis of main boom frame 28, and that this is on the opposite side from the working side of the boom and grapple structure 27. It will be noted further that the parts have been dimensioned and shaped such that the free end 51 of main boom frame 28 may be brought well to the left of the axis of the rear wheels 15 of the machine when the motors 40 and 42 are fully retracted. As will appear more fully hereinafter, this arrangement will bring the rear ends of the logs well forward of the rear wheels 15 so that the logs may be easily handled, both in the skidding and in the stacking operations.

Pivotally connected by means of a suitable pin 50 to the free end 51 of the main boom frame 28 is a heel boom frame 52 consisting of left and right parallel heel boom legs 54 and 55 respectively, and a transverse rod 58 near the free end 65 of heel boom frame 52. Double acting hydraulic motors 63 and 64 are connected between main boom frame 28 and heel boom frame 52 for moving the latter around its pivot 50, as shown. When motors 40 and 42 and 63 and 64 are fully extended, the parts will be in the full reach position shown in phantom outline in FIGURE 1 with the heel boom frame extending out of the figure to the right. It will be apparent that a large range of vertical movement of the free end 65 of heel boom frame 52 is possible with the present linkage. Since the heel boom legs 54 and 55 must support a high bending moment around the connection point of motors 63 and 64, spine braces 60 and 62 are preferably used on the upper edges thereof.

A log grapple 66 is pivotally attached in pendulous fashion on the transverse rod 58 near the free end 65 of heel boom frame 52. This log grapple may take any convenient form, but is preferably a hydraulically actuated grapple having opposed jaws 68 and 69 pivoted on a support block 70. Double acting hydraulic motors 71

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and 72 act between the block 70 and the jaws 68 and 69 for moving the same between their open and closed positions, the open position being shown in phantom outline in FIGURE 3.

The boom and grapple structure also includes a cradle unit 73 consisting of longitudinal ribs 74 and transverse ribs 75 secured together in the configuration shown. The cradle unit is pivotally attached to the heel boom frame 52 near the free end 65 thereof as by means of a transverse rod 77 and a lug 78 fixed to heel boom leg 54. It will be understood that a similar lug connects the cradle unit 73 to the other heel boom leg 55. A pair of hydraulic motors 80 and 81 are connected between heel boom frame 52 and cradle unit 73 to pivot the latter about the axis defined by pin 77.

FIGURES 4, 5 and 6 illustrate the operation of the present machine. Referring first to FIGURE 4, the machine is there shown as having been positioned at the end of a stack of logs 85 and with the boom and grapple extended into position to grasp the logs. This is presumably being done at a cutting or felling location where the logs would have been previously placed in temporary storage stacks. The operation shown in FIGURE 4 may be carried out by actuating motors 40 and 42 alone, or by actuating these motors in combination with motors 63 and 64 to vary the reach of the assembly as desired. The grapple structure will remain vertically oriented because of the pendulous nature thereof. Moreover, the wheels 15 may straddle the end of the stack because of the recessed construction of trailer frame 19. The grapple jaws are then closed to hold the stack.

To load the stack for the skidding operation, motors 40 and 42 are retracted to swing the entire assembly to the left around the axis of pins 31 and 35. This action will lift the end of the stack off the ground and will draw the entire stack toward the machine, positioning the end of the stack well forward of the axis of the rear wheels 15. It will be understood that motors 63 and 64 may be utilized at the same time to assist in the lifting operation and to insure that the end of the stack will clear the frame 19 as the stack rises to the loaded position. The parts will then occupy the positions shown in FIGURE 5, and the vehicle may be propelled forward to drag or skid the logs to another location in the forest. It will be appreciated that the arrangement of main boom frame 28 and its motors 40 and 42 is such that a portion of the load is placed on the vehicle well forward of the rear wheels, providing for stability during the skidding operation.

When the vehicle with its load of logs reaches its destination, cradle unit 73 may be brought into play to assist in the placing of the logs onto a storage stack or onto a truck or the like, as shown in FIGURE 6. In carrying out the stacking operation, motors 80 and 81 are operated to lower cradle unit 73 into engagement with the heel of the stack. All of the hydraulic motors may then be operated to lift the stack into the horizontal and to move it to any desired vertical position. The available range of vertical movement is quite high due to the arrangement of the boom elements. The vehicle 10 will then be propelled toward the stack or truck and the logs can then be lowered into place by operation of the hydraulic motors. It will be understood that the weight of the tractor portion 11 will be sufficient to offset the moment about the rear axis which is produced by the logs during this operation.

It should be apparent that the vehicle as herein de-

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scribed fully meets the objectives of the invention set forth above. Only one operator is required and the handling of logs through the skidding and stacking operations can be carried out quickly and efficiently by this machine.

Since various changes in form, details and proportions will occur to those skilled in the art when they are provided with the benefit of the present disclosure, it will be understood that within the scope of the appended claims, the invention may be practiced otherwise than as herein specifically described.

I claim:

An improved self-loading skidder and stacker for bunched logs comprising a vehicle adapted to be propelled along the ground, a main boom frame pivotally mounted on said vehicle near one end thereof, hydraulic motor means connected between said vehicle and said main boom frame, one end of said hydraulic motor means being pivotally connected to said vehicle at a point spaced farther from said one end of said vehicle than the pivot point of said main boom frame, the other end of said hydraulic motor means being pivotally connected to said main boom frame intermediate the ends thereof, said hydraulic motor means in the fully retracted condition thereof positioning the free end of said main boom frame between the ends of said vehicle, and in the fully extended condition thereof positioning the free end of said main boom frame beyond said one end of said vehicle, a heel boom frame pivotally connected to the free end of said main boom frame for rotation about a horizontal axis, hydraulic motor means connected between said main boom frame and said heel boom frame for moving said heel boom frame about its axis, a log grapple pivotally mounted on said heel boom frame at the free end thereof, a cradle unit pivotally carried on said heel boom frame intermediate the ends of said heel boom frame and having a portion thereof movable in a generally vertical path to engage the heel end of a bunch of logs clamped in said grapple and for forcibly pivoting said bunch of logs about the pivot axis of said grapple, the pivot for said cradle unit being closely adjacent the pivot of said log grapple, said substantially vertical path having a proximal relationship with said main boom frame when the free end of said main boom frame resides between the ends of said vehicle and said generally vertical path being between the pivot locus of said main boom frame and the free end of said main boom frame when said free end resides between the ends of said vehicle, and hydraulic motor means connected between said heel boom frame and said cradle unit for causing said engaging portion of the cradle unit to effect said engagement with the heel end of the bunch of logs, whereby to heel said bunch of logs requires that a sufficient length thereof resides between said grapple and the said substantially vertical path with the consequence that the heeling action provided by said cradle unit takes place at an optimum location between the ends of said vehicle.

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