July 22, 1958 E. C. BUCK 2,844,240

WOOD LOADER

Filed Jan. 18, 1957 5 Sheets-Sheet 1

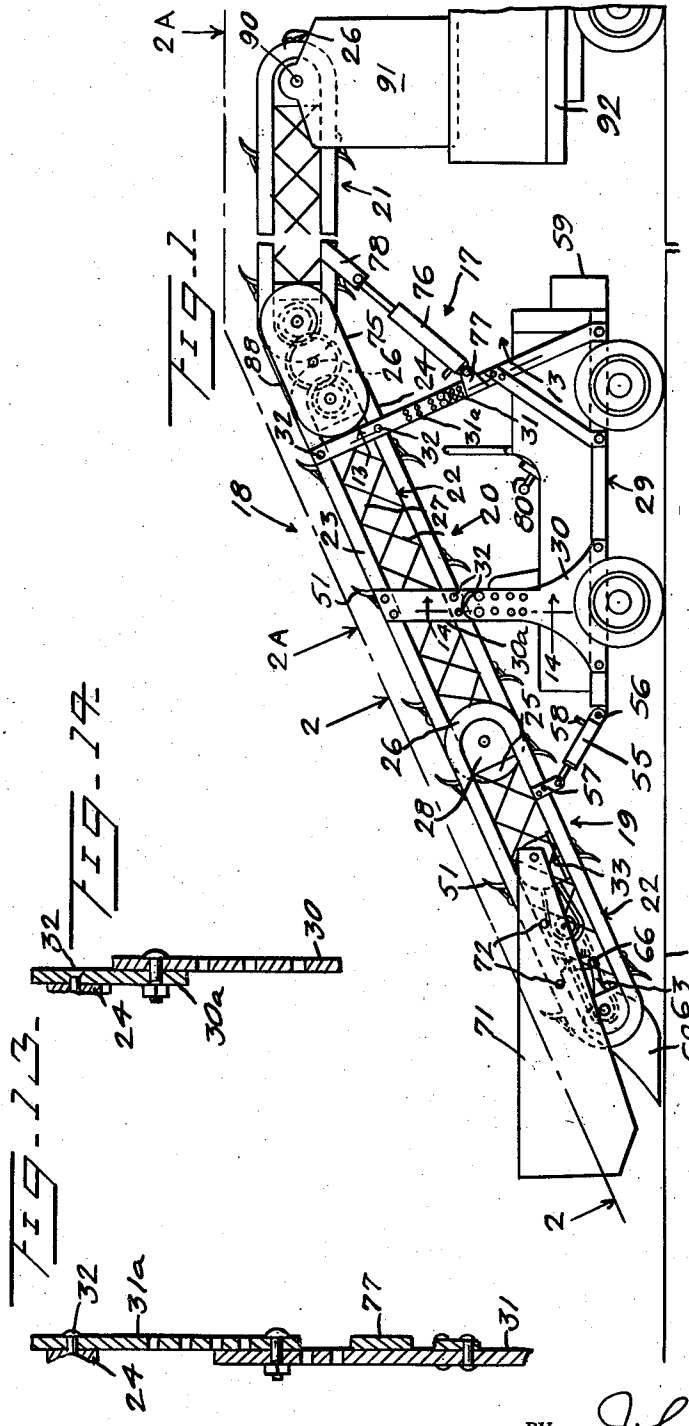


FIG. 1

FIG. 1A

FIG. 1B

INVENTOR
E. C. Buck

BY John N. Randolph
ATTORNEY

July 22, 1958 E. C. BUCK 2,844,240

WOOD LOADER

Filed Jan. 18, 1957 5 Sheets-Sheet 2

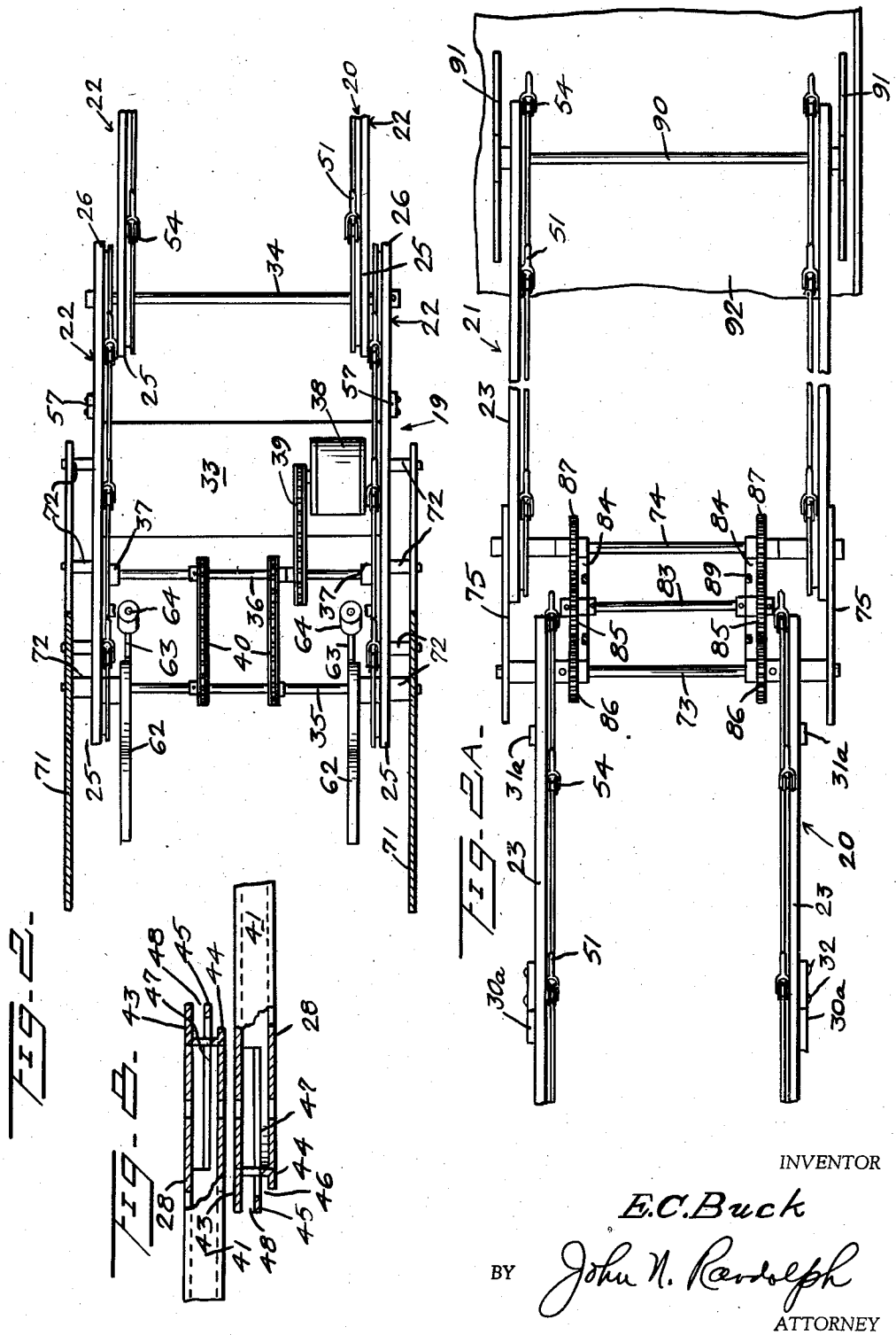


FIG. 2.

FIG. 2A.

FIG. 3.

INVENTOR

E.C. Buck

BY John N. Randolph

ATTORNEY

July 22, 1958 E. C. BUCK 2,844,240

WOOD LOADER

Filed Jan. 18, 1957 5 Sheets-Sheet 3

FIG. 3

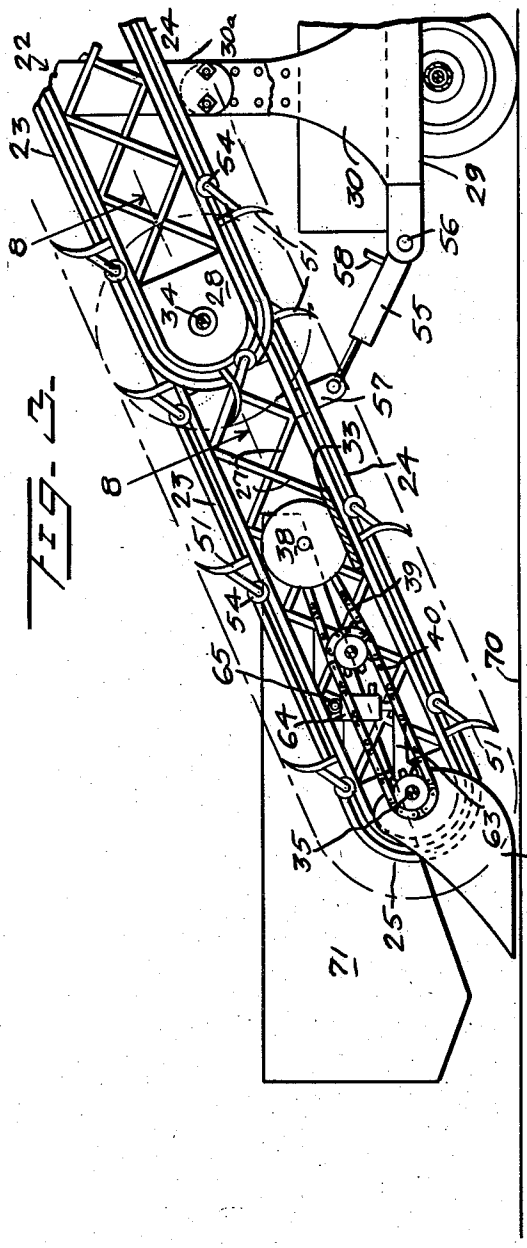
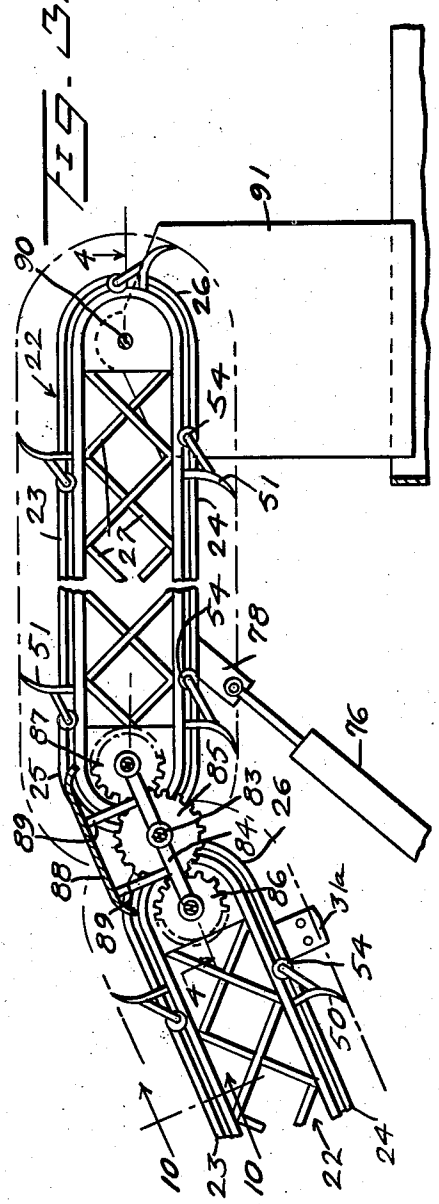


FIG. 3A



INVENTOR
E. C. Buck

BY John N. Randolph
ATTORNEY

July 22, 1958 E. C. BUCK 2,844,240

WOOD LOADER

Filed Jan. 18, 1957 5 Sheets-Sheet 4

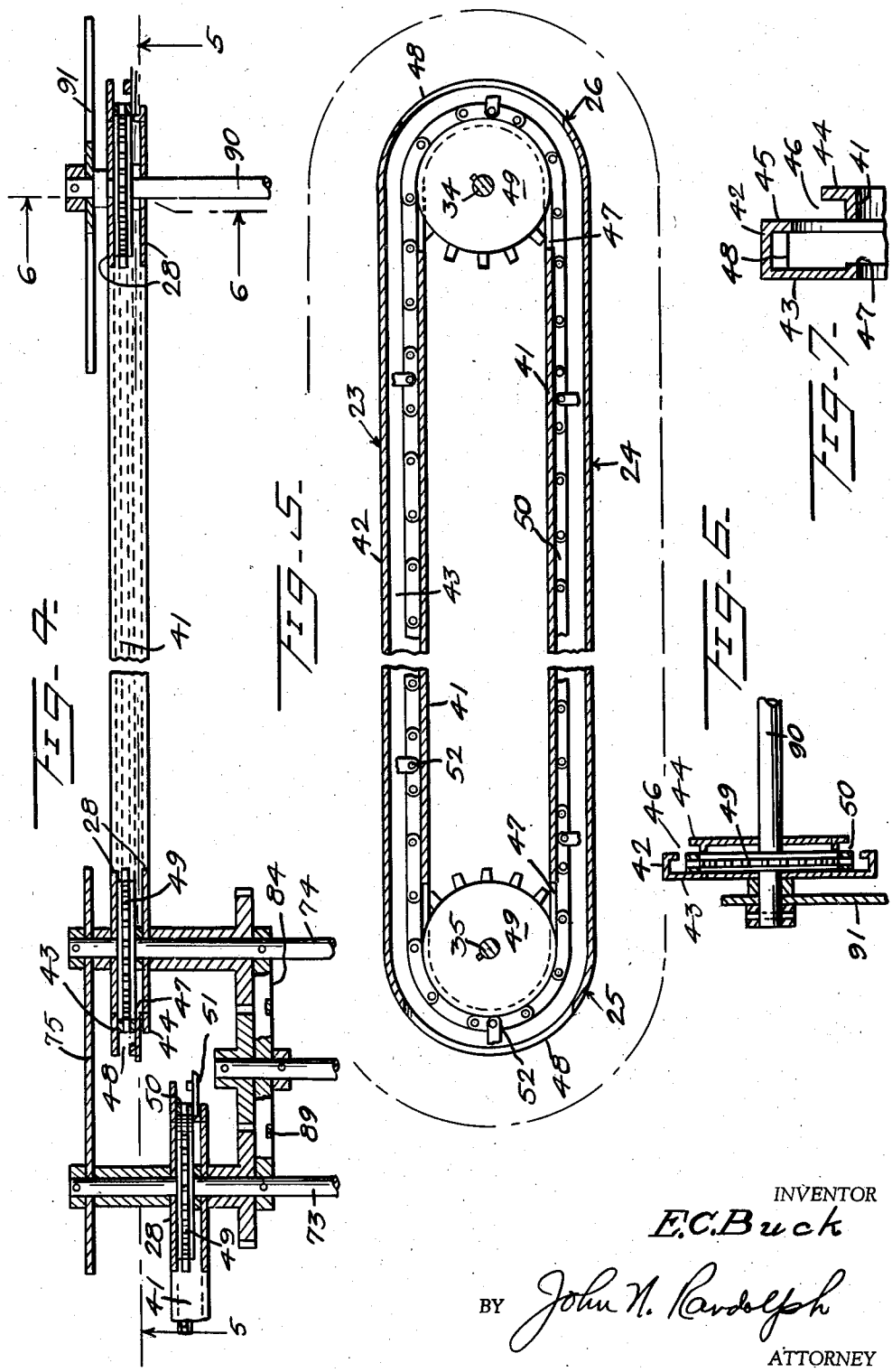


FIG. 4

FIG. 5

FIG. 6

FIG. 7

INVENTOR
E. C. Buck
BY John N. Randolph
ATTORNEY

July 22, 1958 E. C. BUCK 2,844,240

WOOD LOADER

Filed Jan. 18, 1957 5 Sheets-Sheet 5

Fig. 9.

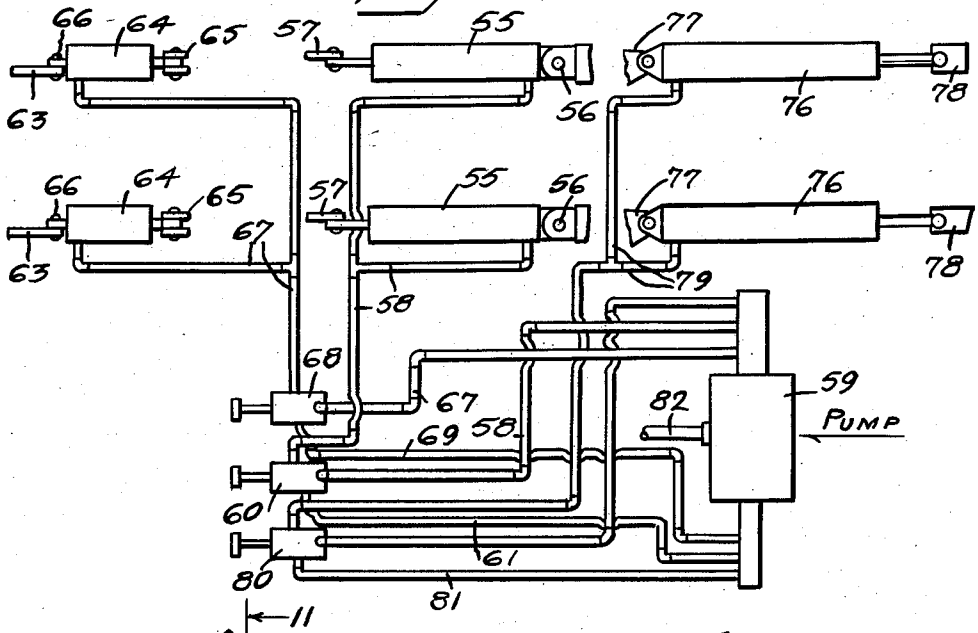


Fig. 10.

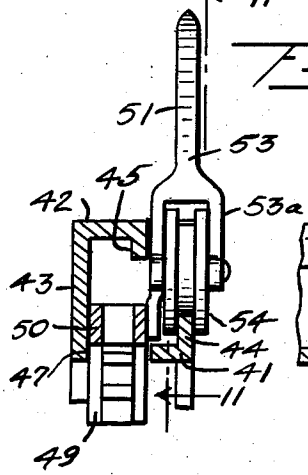


Fig. 11.

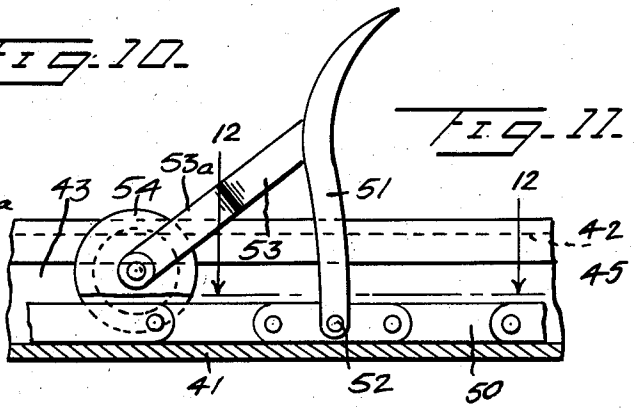
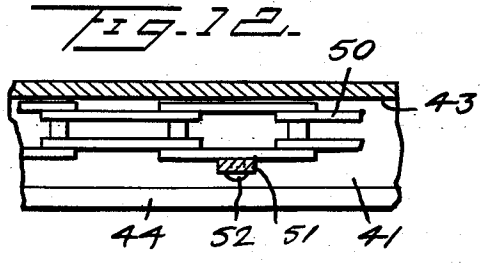


Fig. 12.



INVENTOR
E. C. Buck
BY John N. Randolph
ATTORNEY

United States Patent Office 2,844,240 Patented July 22, 1958

2,844,240

WOOD LOADER

Elbert C. Buck, Lufkin, Tex.

Application January 18, 1957, Serial No. 634,865

6 Claims. (Cl. 198—7)

This invention relates to a novel power-driven conveyor for picking up wood, the pieces of which are of substantially uniform length, from a rick, and for conveying the wood to an elevated position for discharge of the wood from the conveyor onto the bed of a truck or trailer.

More particularly, it is an aim of the present invention to provide a power-driven loader including power means for adjusting and manipulating various parts of the loader to facilitate the picking up of the wood from the rick and the discharge of the wood into a truck or trailer body.

Still another object of the invention is to provide a wood loader including wood engaging conveyor hooks which are supported for travel in an endless path and which are arranged in a plurality of sets whereby the wood is successively conveyed by hooks of different sets of hooks in its travel from end-to-end of the conveyor.

Still a further object of the invention is to provide novel means for supporting endless chains to which the hooks are connected and which means additionally provide supports and guides for the hooks in the travel of the hooks with the chains.

A further object of the invention is to provide novel means for loosening the wood in a rick to facilitate the picking up of the wood by the hooks of a lower set of hooks.

Still a further object of the invention is to provide novel guide means for straddling a rick of wood to prevent lateral movement of the wood being picked up from the rick and for guiding the wood during the initial stage of its travel up the conveyor.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a fragmentary side elevational view of the loader;

Figure 2 is an enlarged sectional view, partly in top plan, taken substantially along a plane as indicated by the line 2—2 of Figure 1;

Figure 2A is an enlarged fragmentary plan view of a portion of the loader, taken substantially along the line 2A—2A of Figure 1;

Figure 3 is an enlarged vertical sectional view taken longitudinally through one end of the loader;

Figure 3A is a similar view taken longitudinally through the other end of the loader;

Figure 4 is an enlarged fragmentary longitudinal sectional view, taken substantially along a plane as indicated by the line 4—4 of Figure 3A;

Figure 5 is a longitudinal sectional view, taken substantially along a plane as indicated by the line 5—5 of Figure 4 and illustrating one of the endless guide members;

Figure 6 is a fragmentary transverse sectional view, taken substantially along a plane as indicated by the line 6—6 of Figure 4;

Figure 7 is an enlarged cross sectional view taken through an end portion of an upper flight of one of the guide members, with the chain and other parts removed therefrom;

Figure 8 is a horizontal sectional view taken through the adjacent ends of two of the overlapping guide members;

Figure 9 is a diagrammatic view of the hydraulic control system of the loader;

Figure 10 is an enlarged fragmentary cross sectional view taken substantially along a plane as indicated by the line 10—10 of Figure 3A;

Figure 11 is a fragmentary longitudinal sectional view, taken substantially along a plane as indicated by the line 11—11 of Figure 10;

Figure 12 is a fragmentary sectional view taken substantially along a plane as indicated by the line 12—12 of Figure 11;

Figure 13 is an enlarged sectional view taken substantially along a plane as indicated by the line 13—13 of Figure 1, and

Figure 14 is a fragmentary vertical sectional view on an enlarged scale, taken substantially along a plane as indicated by the line 14—14 of Figure 1.

Referring more specifically to the drawings, the loader in its entirety is designated generally 17 and includes an endless conveyor, designated generally 18, which is composed of a forward section 19, an intermediate section 20 and a rear or discharge section 21.

Each of the sections 19, 20 and 21 includes a pair of spaced substantially parallel sides 22 forming an endless guide member which is provided with an upper flight 23, a lower flight 24 and rounded ends 25 and 26 forming integral connections between corresponding ends of the upper and lower flights. Each side 22 is preferably provided with truss bracing 27 connecting the upper and lower flights thereof and with a pair of laterally spaced plates 28 forming webs within each of the rounded ends 25 and 26, as best illustrated in Figure 4.

The intermediate section 20 of the endless conveyor 18 is adapted to be disposed at an incline above and longitudinally of a self-propelled vehicle 29 and is supported by a pair of standards 30 and a pair of standards 31. The lower ends of the standards 30 are shown in Figure 1 secured to opposite sides of the rear end of the vehicle 29 and the upper ends of said standards 30 are secured by fastenings 32 to the sides 22 of the section 20. The uprights 31 have their lower ends secured to the sides of the vehicle 29, near the forward end of said vehicle, and have upper ends which are secured by additional fastenings 32 to said sides 22 of the section 20. The uprights 30 and 31 include extensible upper sections 30*a* and 31*a*, respectively, for varying the elevation and the angle of slope of the intermediate section 20.

A base plate 33 extends between the sides 22 of the lower or front section 19 and is secured at its ends to the upper sides of the lower flights 24 thereof, and is disposed intermediate of the ends of said sides 22. The sides 22 of the section 19 are spaced a greater distance apart than the sides 22 of the intermediate section 20, so that the upper or rear ends 26 thereof may straddle the lower or forward ends 25 of the sides 22 of the section 20, as best illustrated in Figure 2. A shaft 34 extends through the webs 28 of said overlapping ends of the frame sides of the sections 19 and 20, for pivotally connecting the section 19 to the lower end of the section 20. A shaft 35 extends through and is journaled in the webs 28 of the lower ends 25 of the sides 22 of the lower section 19. A countershaft 36 extends between said sides 22 and is journaled in bearings 37 which are suitably secured to portions of the truss bracing 27 of the two sides 22 of the section 19. The shaft 36 is disposed between the shaft 35 and the base

plate 33. A motor 38 is mounted on and fixed to the base plate 33 and is connected to the countershaft 36 by a sprocket wheel and chain drive 39. Likewise, the countershaft 36 is connected to the shaft 35 by a sprocket wheel and chain drives 40.

The guide member of each of the sides 22, comprising the upper flight 23, lower flight 24 and the rounded ends 25 and 26 thereof, comprises an inner wall 41, an outer wall 42 and an outer side wall 43. The inner wall 41 at its inner longitudinal edge is provided with an outturned flange 44 and the outer wall 42 at its inner edge is provided with an inturned flange 45. The flanges 44 and 45 are disposed parallel to one another and to the outer wall 43. The inner wall 41 is wider than the outer wall 42 so that the flange 44 is spaced inwardly a greater distance from the outer wall 43 than the flange 45 to provide a continuous slot 46 therebetween. The inner wall 41 is provided with slots 47 in the end portions 25 and 26 and the outer wall 42 is provided with slots 48 in said end portions 25 and 26, which slots 48 are each of a length less than the length of each slot 47, as best seen in Figure 5.

In assembling the conveyor section 19, sprocket wheels 49 are inserted in the ends of the sides 22 thereof through the slots 48 and 47. An endless chain 50 is then inserted into the endless guide member of each side 22 through the slot 46 thereof, after which the shafts 34 and 35 are inserted through the webs 28 of said sides 22 and through the sprocket wheels 49 to which the sprocket wheels 49 are keyed. The chains 50 are thus trained around the sprocket wheels 49 and travel in the channels of the guide members against and along the inner walls 41 thereof. It will also be understood that the chains and sprocket wheels are similarly mounted in the guide channels of the sides 22 of the intermediate section 19 and that the shaft 34 extends through and is keyed to the sprocket wheels 49 which are disposed for rotation in the ends 25 of said sides of the section 20.

Each of the chains 50 has a plurality of hooks 51 connected thereto and projecting outwardly therefrom. Each hook 51 has an inner end which is pivotally connected at 52, as best seen in Figure 11, to a side link of the chain 50 thereof between the chain and flange 44, as seen in Figure 12. The outer end of each hook 51 is tapered and is preferably curved forwardly in the direction of movement of the hook. Each hook 51 has an arm 53 extending rearwardly from the intermediate portion thereof and obliquely away from the outer end of the hook. Each arm 53 has a bifurcated free end 53*a* in which is journaled a grooved roller 54. The roller 54 rides the flange 44 to prevent the hook 51 from swinging backward relative to its direction of travel. The hooks 51, arms 53 and rollers 54 are spaced inwardly from the outer flanges 45, as best seen in Figure 10.

As best seen in Figures 1 and 3, a pair of hydraulic rams 55 are pivotally supported at 56 on the end of the vehicle 29, beyond which the conveyor section 19 is disposed. The outer ends of the rams 55 are pivotally connected to brackets 57 which are secured to the outer walls 43 of the lower flights 24 of said section 19, which brackets are spaced from the ends of the section 19. A hose 58 leads to each ram 55 from a pump 59, as best illustrated in Figure 9. A valve 60 provides a means for manually controlling the supply of a hydraulic fluid under pressure simultaneously to the rams 56 from the pump 59 for extending said rams to elevate the section 19 about its pivot 34, or for returning the hydraulic fluid from the rams 56 through a return conduit 61, which leads from the valve 60 to the inlet or suction side of the pump 59, for permitting a downward swinging movement of the conveyor section 19.

As best seen in Figures 1, 2 and 3, two shoe members 62 are pivotally mounted on the shaft 35 and extend downwardly and forwardly therefrom and are disposed between the sides 23 of the conveyor section 19. The shoe members 62 have rearwardly extending arms 63. A pair of hydraulic rams 64 are pivotally suspended from brackets 65 which are secured to the upper flights 23 of the section 19, and the lower ends of said rams 64 are pivotally connected at 66 to the rear free ends of the arms 63. The rams 64 are also connected as a pair by a hose or conduit 67 to the pressure side of the pump 59 and a valve 68 is interposed in said conduit and is adapted to be manually manipulated for supplying the hydraulic medium under pressure to the rams 64 or for returning the hydraulic medium from said rams to the suction side of the pump 59 through a branch return conduit 69. The rams 64 can be extended to cause the shoe members 62 to be swung upwardly about the shaft 35 as a pivot. The shoe members 62 extend downwardly from the shaft 35 a sufficient distance so that when in contact with the ground 70, as seen in Figures 1 and 3, said shoe members will support the forward lower end of the conveyor section 19 sufficiently elevated so that the hooks 51 in passing therearound will not contact the ground.

A guide plate 71 is attached to each side 22 of the section 19 and is supported in outwardly spaced relationship thereto by a plurality of fastening elements 72 which extend outwardly from said side 22. The guide plates 71 extend from the forward lower end of the section 19 for a purpose which will hereinafter be described.

As previously stated, each of the guide channels of the intermediate section 20 contains an endless chain 50 and a pair of sprocket wheels 49 over which the chain is trained, and this likewise applies to each of the guide channels of the rear discharge section 21. Likewise, each of the chains 50 is provided with a plurality of hooks 51 each of which carries a roller 54. The hooks 51 of the two chains of each conveyor section are disposed in transversely aligned relationship, as seen in Figures 2 and 2A. The sprocket wheels at the upper end of the intermediate section 20 are keyed to a shaft 73, and the sprocket wheels 49 at the adjacent end of the section 21 are keyed to a shaft 74. As best seen in Figures 2A and 4, the adjacent ends of the sections 20 and 21 are connected by links 75 which engage end portions of the shafts 73 and 74 for mounting the inner end of the section 21 for swinging movement relative to the adjacent upper end of the section 20. As seen in Figure 1, a pair of hydraulic rams 76 have corresponding ends pivotally connected to brackets 77 which are secured to the stationary lower portion of the uprights 31 and the extensible upper ends of said hydraulic rams 76 are pivotally connected to brackets 78 which are fixed to and extend downwardly from the sides 22 of the conveyor section 21 and which are spaced from the ends of said section. The rams 76 are connected as a pair by a conduit 79 to the pressure side of the pump 59 and which conduit has a manually operated valve 80 interposed therein for regulating the supply of the hydraulic medium under pressure to the rams 76 for extending said rams to swing the conveyor section 21 upwardly. A return branch conduit 81 leads from the valve 80 to the return side of the pump 59 for retracting the rams 76 for swinging the conveyor section 21 downwardly. The portions of the conduits 58, 67 and 79 which connect with the rams constitute flexible sections of said conduits to enable said rams to pivot freely. The pump 59 is preferably mounted on the forward end of the vehicle 29 and is driven by the crankshaft 82 of the vehicle engine for an extension thereof. The valves 60, 68 and 80 may be located in any conveniently accessible position on the vehicle 29, as for example on the instrument panel thereof.

A countershaft 83 is disposed between the shafts 73 and 74 and is journaled in the intermediate portions of a pair of bearings 84. The end portions of the bearings 84 are supported by the shafts 73 and 74 which are

journaled therein. The shaft **83** carries a pair of gears **85** which are disposed between and mesh with gears **86** and **87** which are fixed to the shafts **73** and **74**, respectively, so that the shaft **74** is driven from and in the same direction as the shaft **73**. A bridge **88** is supported above the gears **85**, **86** and **87** by standards **89** which are fixed to and rise from the bearings **84**.

The sprocket wheels at the other discharge end of the section **21** are mounted on a shaft **90**. A pair of guide plates **91** are swingably suspended from the ends of the shaft **90** and are disposed outwardly with respect to the sides **22** of said conveyor section **21**.

The forward section **19** of the endless conveyor **18** is shown extending downwardly and rearwardly from the vehicle **29** and the rear or discharge section **21** is shown disposed above and extending from the forward end of the vehicle **29**. However, if desired, the disposition of the conveyor **18** can be reversed relative to the vehicle **29**. The loader **17** is of a width no greater than the width of the vehicle **29** so that it can be conveyed by said vehicle to any location where wood is to be loaded. While the loader **17** is in transport on the vehicle **29** the rams **55** are extended to support the outer end of the lower section **19** in a raised position. When the loader **17** is positioned for loading, the rams **55** are retracted to position the shoes **62** in contact with the ground **70**. The vehicle **29** is then backed to cause the guide plates **71** to straddle a rick of wood, not shown, to be loaded, so that the shoes **62** will engage under and lift an end of the rick. The rams **76** are extended to elevate the discharge section **21** and its guide plates **91** so that a truck or trailer **92** can be backed under the conveyor section **21** and so that the discharge end of the conveyor section will be initially positioned under a part of the forward end of the truck or trailer body. The motor **38** is operated to drive the chains **50** of the lower section **19** clockwise as seen in Figure 1 and so that the chains of the other sections will be driven in the same direction. As the hooks **51** of the chains of the lower section **19** pass around the shoes **62**, said hooks will pick up the wood from the rick which is supported on said shoes and will convey the wood upwardly and onto the upper flights **23** of the section **19**, where the wood will slide along the top walls and outer walls **42** of said upper flights. The wood handled by the conveyor **18** is of a length greater than the width of the sections of said conveyor and somewhat less than the spacing between the guide plates **71** and also the spacing between the guide plates **91**. Thus, the guide plates **71** will guide the wood during its initial upward travel to insure that the wood is properly positioned on the upper flights **23** of the section **19**. From time to time as required, the rams **64** can be extended and retracted to effect an up and down swinging movement of the shoes **62** for loosening the ricked wood and for kicking the wood upwardly onto the upper edges of the shoes **62** to be engaged by the hooks **51** traveling around the lower ends **25** of the sides **22**. The hooks **51** of the intermediate section **20** are so timed relative to the hooks **51** of the lower section **19** that as said last mentioned hooks which are conveying the wood in advance thereof commence their travel around the upper ends **26** of the sides of the section **19**, the hooks **51** of the section **20** which are commencing their upward travel along the upper flights **23** of the section **20** will engage the wood as it is released by the hooks of the section **19**. In a like manner, the hooks **51** of the section **20** will convey the wood onto the bridge member **88**. The hooks **51** of the section **21** are so timed with respect to the hooks of the section **20** that as the wood is propelled onto the bridge member **88** and released by the hooks of the section **20**, the wood will be engaged by the hooks **51** of the section **21** and carried onto the upper flights **23** thereof. As the wood reaches the ends **26** of the sides **22** of section **21** it will be discharged by gravity into the truck body **92** and will descend between and be guided by the plates **91**, which thus assist in stacking the wood on the bed of the truck body **92**. As the wood is thus stacked, the rams **76** can be extended to raise the discharge end of the conveyor section **21** when necessary. Additionally, as the vehicle **29** is backed to advance the conveyor section **19** into the ricked wood, the discharge end of the conveyor will be moved rearwardly with respect to the truck or trailer body **92**. In this way the wood can be stacked in the truck or trailer to approximately the same height as the rick from which the wood is loaded.

The loader **17** is capable of loading wood on a truck or trailer much more rapidly than the same operation can be accomplished manually. One operator from a position on the truck or trailer **92** can assist in arranging the loaded wood, which is supplied by the loader to the truck or trailer as rapidly as the operator on the truck or trailer can handle the wood.

Various modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A loader for ricked wood comprising, in combination with a self-propelled vehicle, a load conveyor comprising a forward section, an intermediate section and a rear section, each of said sections including a frame having spaced substantially parallel frame sides, uprights fixed to and rising from the sides of said vehicle and secured to the frame of said intermediate section for supporting the intermediate section above the vehicle, longitudinally thereof and at an incline, means pivotally connecting the rear end of the frame of said forward section to the lower end of the frame of said intermediate section for vertical swinging movement of the forward section relative to the intermediate section, means swingably connecting an inner end of the frame of said rear section to the upper end of the frame of said intermediate section, ram means connected to an end of the vehicle and to the frame of the forward section for raising and lowering the forward section relative to the intermediate section, a second ram means extending between and connected to the frame of said rear section and certain of said uprights for raising and lowering the rear section relative to the intermediate section, each of said sections being provided with an endless conveyor, a power source supported by the frame of one of said sections for driving the endless conveyor thereof, means forming driving connections between the endless conveyors of the different sections for causing said endless conveyors to be driven in unison, each of said endless conveyors having outwardly projecting wood propelling hooks, each of the frame sides having an upper surface, the upper surfaces of the frame sides of each of said sections being adapted to support the load being propelled by the hooks of the upper flight of the endless conveyor thereof traveling along said upper surfaces, the adjacent end portions of said endless conveyors being disposed relative to one another whereby the load will be propelled continuously by the hooks of the different conveyors from end-to-end of the loader, shoes connected to and extending downwardly and forwardly from the lower end of the frame of said forward section for supporting said lower end of the frame of said forward section and the propelling hooks, passing therearound, above and out of contact with the ground, said shoes being supported by the frame of said forward section to straddle the hooks and having upwardly and rearwardly inclined upper edges adapted to deflect the wood to be loaded upwardly and toward the lower end of the forward section and into a position to be engaged by the hooks, means pivotally connecting said shoes to the frame of said forward conveyor section, and ram means connected to the frame of said forward

section and to said shoes for rocking the shoes vertically about the pivots thereof.

2. A loader for ricked wood comprising, in combination with a self-propelled vehicle, a load conveyor comprising a forward section, an intermediate section and a rear section, uprights fixed to and rising from the sides of said vehicle and secured to said intermediate section for supporting the intermediate section above the vehicle, longitudinally thereof and at an incline, means pivotally connecting the rear end of said forward section to the lower end of said intermediate section for vertical swinging movement of the forward section relative to the intermediate section, means swingably connecting an inner end of said rear section to the upper end of said intermediate section, ram means connected to an end of the vehicle and to the forward section for raising and lowering the forward section relative to the intermediate section, a second ram means extending between and connected to said rear section and certain of said uprights for raising and lowering the rear section relative to the intermediate section, each of said sections being provided with an endless conveyor, a power source supported by one of said sections for driving the endless conveyor thereof, means forming driving connections between the endless conveyors of the different sections for causing said endless conveyors to be driven in unison, each of said endless conveyors having outwardly projecting wood propelling hooks, each of said sections having an upper flight adapted to support the load being propelled by the hooks of the endless conveyor thereof traveling along said upper flight, the adjacent end portions of said endless conveyors being disposed relative to one another whereby the load will be propelled continuously by the hooks of the different conveyors from end-to-end of the loader, shoe members connected to and extending downwardly and forwardly from the lower end of said forward section for supporting said lower end of the forward section and the propelling hooks, passing therearound, above and out of contact with the ground, said shoes having upwardly and rearwardly inclined upper edges adapted to deflect the wood to be loaded upwardly and toward the lower end of the forward section and into a position to be engaged by the hooks, each of said sections having spaced substantially parallel endless guide channels, sprocket wheels rotatably mounted in the ends of each guide channel, an endless guide chain disposed for movement in each guide channel and trained over the sprocket wheels thereof, the chains of each pair of guide channels comprising the endless conveyor, and said hooks being connected to and extending outwardly from said chains and from the guide channels in which the chains are movably disposed.

3. A loader as in claim 2, each of said guide channels having an endless slot through which the hooks project and in which portions of the hooks are disposed to travel, each of said guide channels having an endless rail disposed adjacent the slot thereof, journal means supported by each of the hooks, and a roller rotatably supported by each journal means in position to engage the rail behind the hook thereof to resist backward yielding movement of the hook.

4. In a loader, a pair of elongated substantially parallel endless guide channels, bearing means connected to the ends of said guide channels, shafts disposed transversely of the ends of the guide channels and journaled in the bearing means, sprocket wheels connected to the shafts and having portions rotatably disposed in the guide channel ends, an endless chain disposed for movement in each guide channel and trained over the sprocket wheels thereof, said guide channels having inner walls against which flights of the endless chains are disposed for sliding movement between the sprocket wheels engaged thereby, each of said guide channels having an endless slot, and load conveying hooks connected to each endless chain and extending outwardly through the guide channel slot, said hooks having portions disposed to travel in said slot during movement of the hooks around the guide channel.

5. In a loader as in claim 4, each of said guide channels being provided with an endless rail, grooved rollers engaging said rails, and arms connected to and extending from said hooks and in which said rollers are journalled in trailing positions relative to the hooks.

6. In a loader as in claim 4, each guide channel having inwardly opening slots at the ends thereof through which portions of the sprocket wheels project into the guide channel for engaging the chain.

References Cited in the file of this patent

UNITED STATES PATENTS

504,589	Kaime	Sept. 5, 1893
1,155,598	Mayers	Oct. 5, 1915
1,306,462	Bergerud	June 10, 1919
1,506,843	Komarnisky	Sept. 2, 1924
1,567,473	Starr	Dec. 29, 1925
1,619,260	Joy	Mar. 1, 1927
1,739,624	Whamond	Dec. 17, 1929
2,220,398	Dreikosen	Nov. 5, 1940
2,367,784	Knoizen et al.	Jan. 23, 1945
2,653,721	Cantrell	Sept. 29, 1953
2,778,477	Lundahl	Jan. 22, 1957

FOREIGN PATENTS

158,718	Australia	Sept. 9, 1954