June 9, 1959 A. ROBERTS 2,889,858

AUTOMATIC LOG FEEDING AND SAWING APPARATUS

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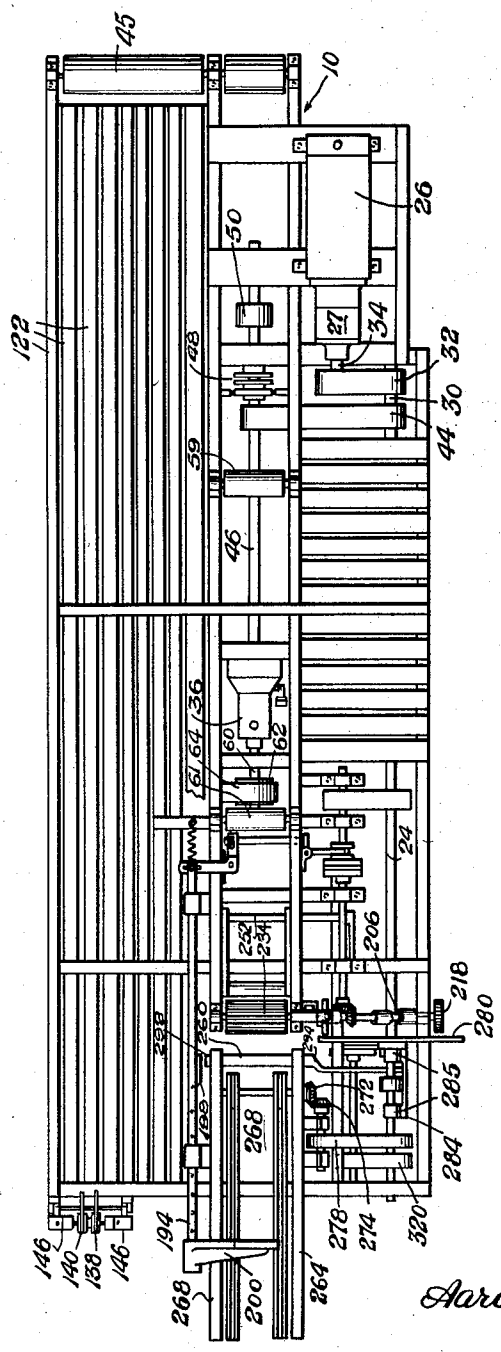
Fig. 1.



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AUTOMATIC LOG FEEDING AND SAWING APPARATUS

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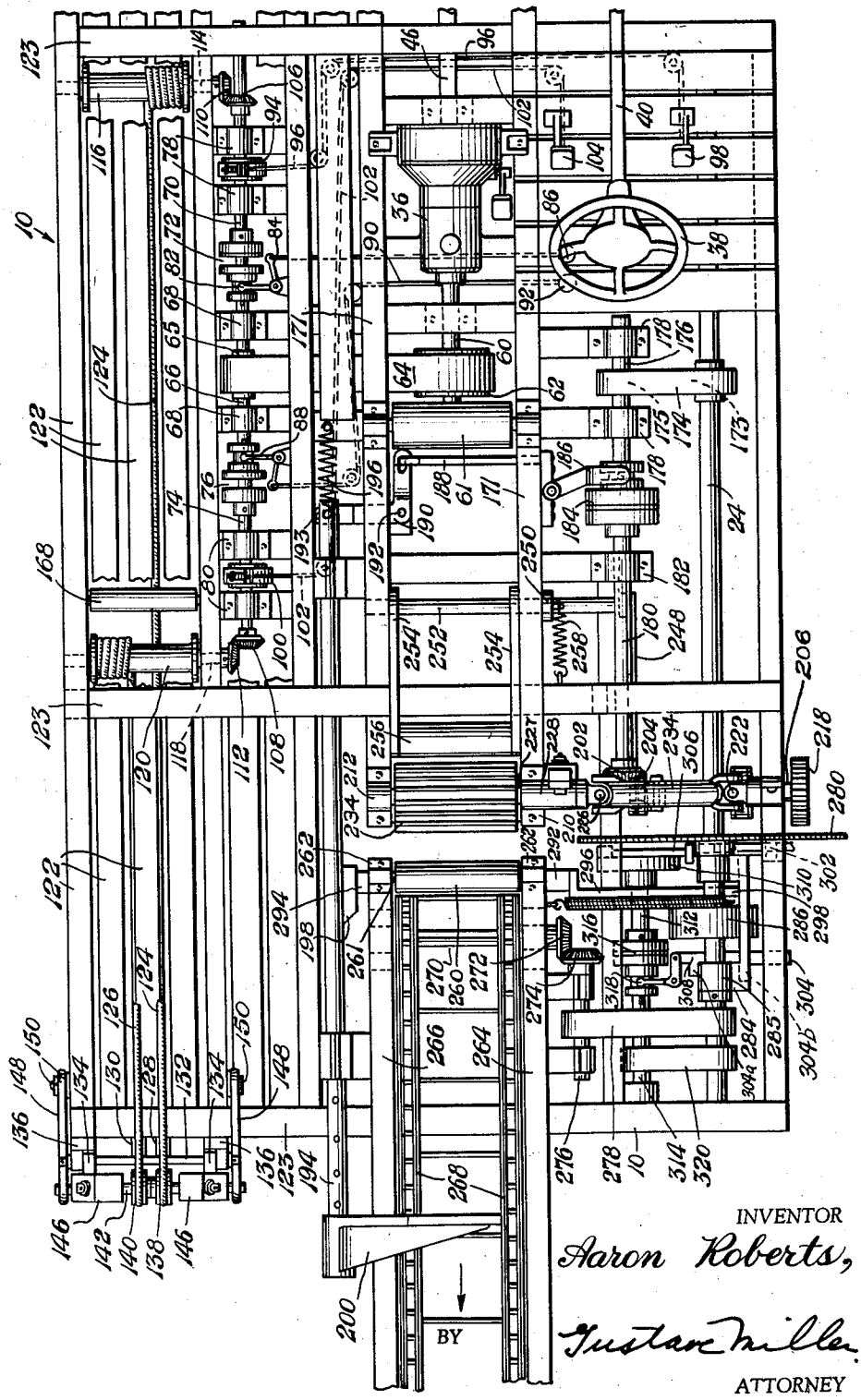
Fig. 2a.



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AUTOMATIC LOG FEEDING AND SAWING APPARATUS

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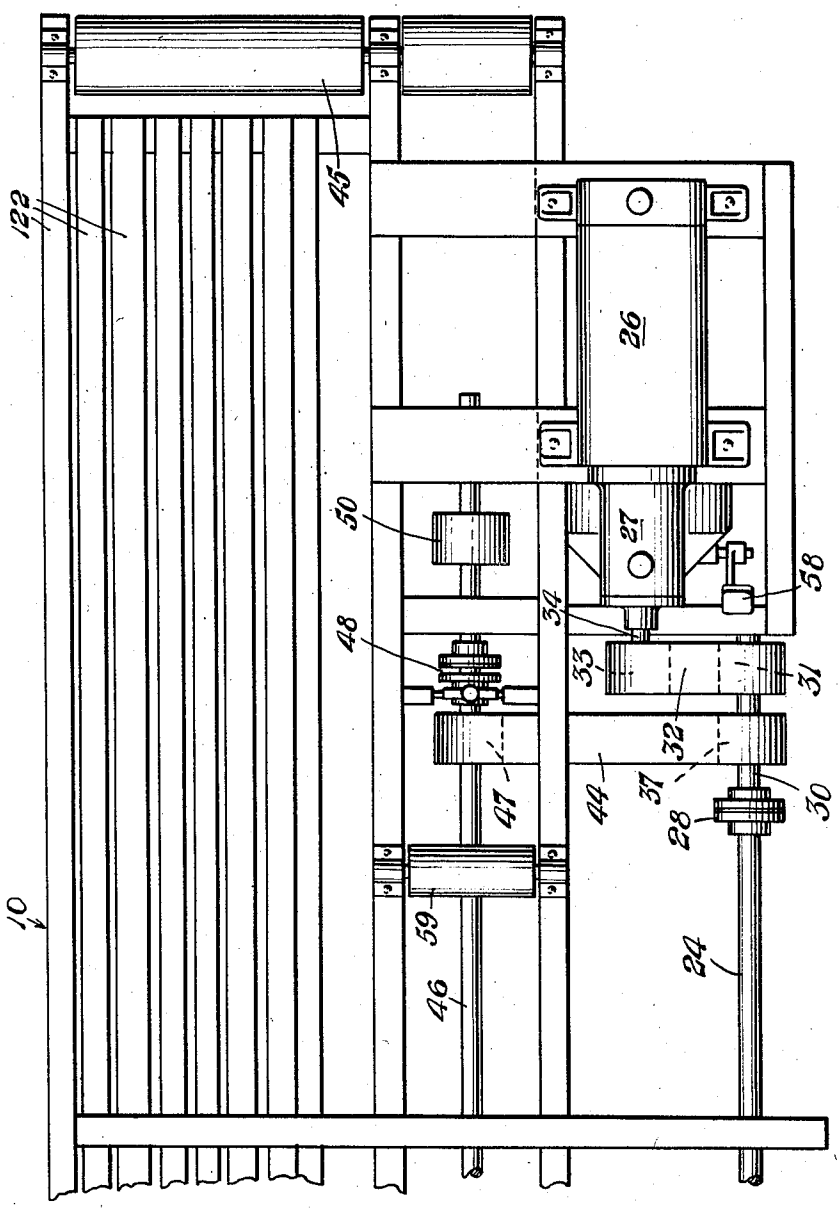

Fig. 2b.

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AUTOMATIC LOG FEEDING AND SAWING APPARATUS

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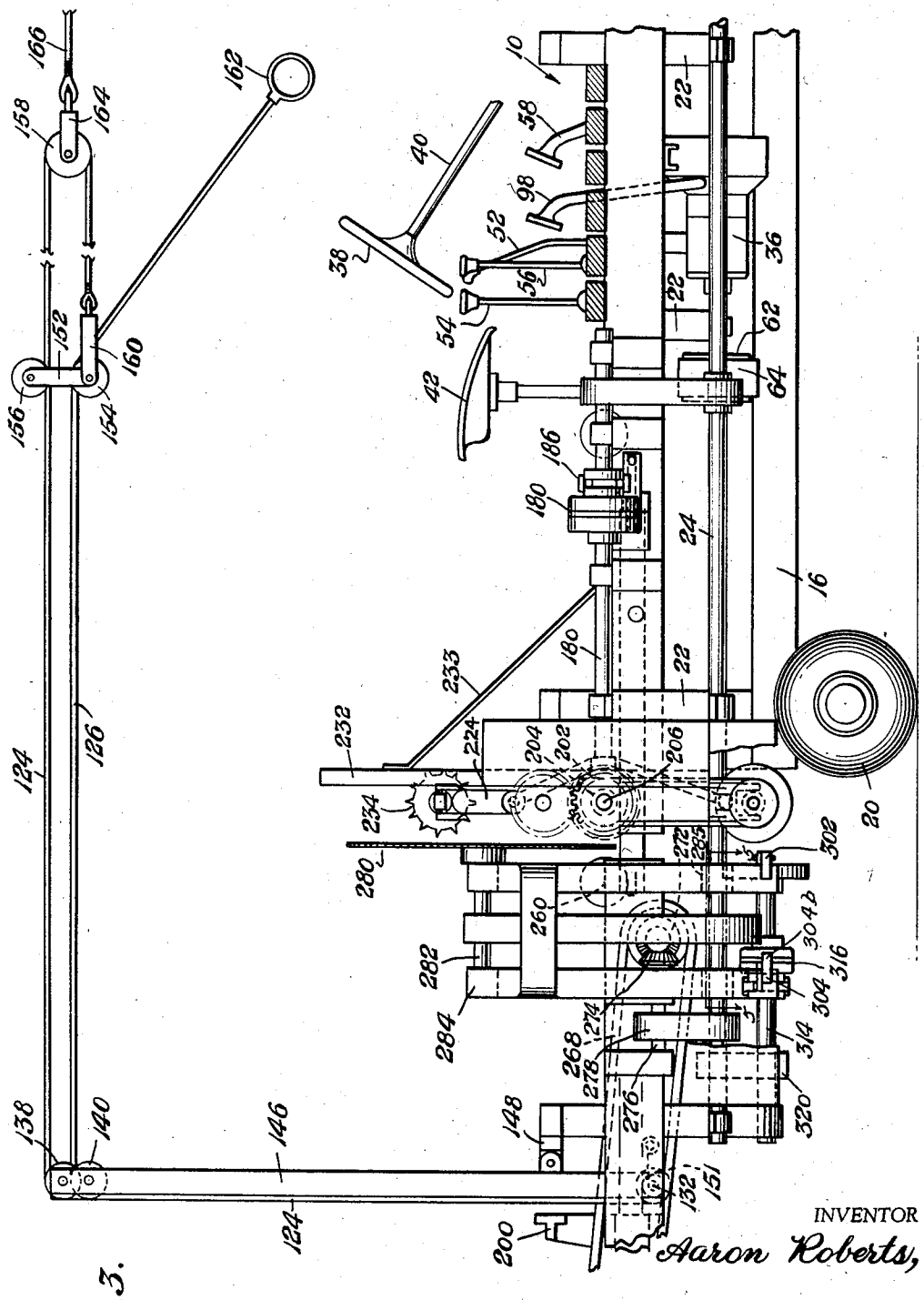

Fig. 3.

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Fig. 4.

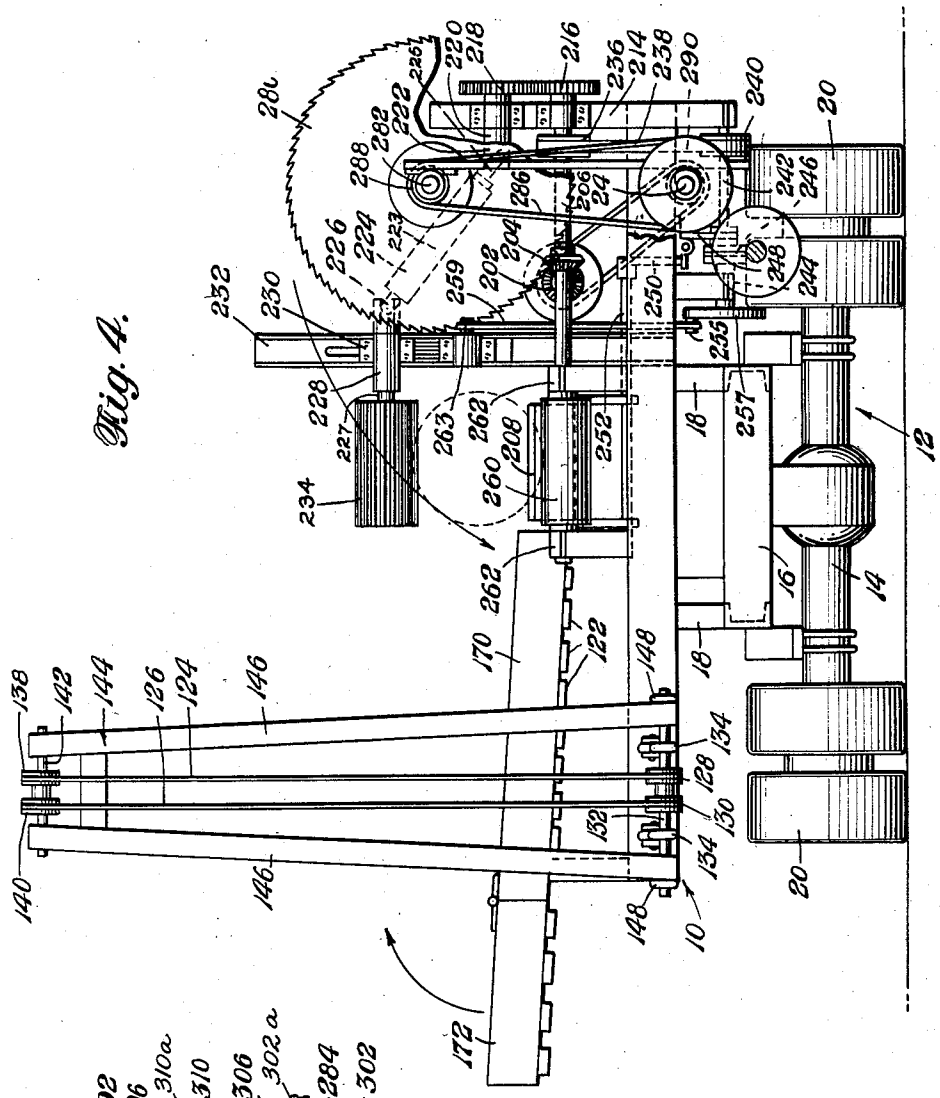
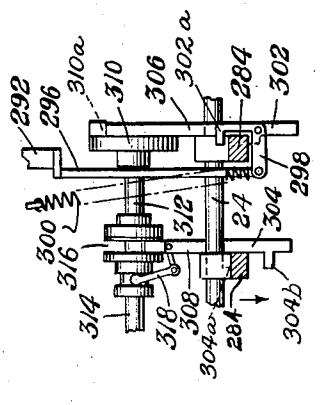


Fig. 5.



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United States Patent Office

2,889,858

Patented June 9, 1959

2,889,858

AUTOMATIC LOG FEEDING AND SAWING APPARATUS

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Application May 1, 1956, Serial No. 581,884

5 Claims. (Cl. 143—46)

This invention relates to a log-sawing device, and it particularly relates to a portable device which can be used in the woods.

It is one object of the present invention to provide a readily transportable log-sawing device which is compact in construction and easy to operate.

Another object of the present invention is to provide a readily transportable log-sawing device wherein the saw is adapted to operate with equal efficiency on wood of both small and large diameters.

Other objects of the present invention are to provide an improved log-sawing device, of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, this invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

Fig. 1 is a top plan view of an entire device forming an embodiment of the present invention.

Fig. 2–*a* is a top plan view of the saw end of the device of Fig. 1.

Fig. 2–*b* is a top plan view of the engine end of the device.

Fig. 3 is a side elevational view of the saw end of the device.

Fig. 4 is an end view of the device.

Fig. 5 is an enlarged, detail view of the saw-frame operating mechanism, taken substantially along the line 5—5 of Fig. 3 as viewed in the direction indicated by the arrows.

Referring now in greater detail to the drawing wherein similar reference characters refer to similar parts, there is shown a frame 10 providing a support for the various parts of the machine. This frame is supported for movement on front and rear wheel assemblies, such as shown at 12 in Fig. 4.

The wheel assembly 12 comprises an axle 14 suspended from a support 16 which is, in turn, connected to the bottom of the frame 10 by struts 18. Double wheels 20 are provided at each end of the axle.

Mounted on the frame 10 as by bearings 22, Fig. 3, is a master shaft 24 connected to the main motor 26 through a clutch 28 connecting it to a shaft 30 having a pulley 31 on which is mounted a belt 32, the belt 32 being positioned on the pulley 31 on the shaft 30 and a pulley 33 on the motor shaft 34 from transmission 27 and motor 26, as best shown in Fig. 2–*b*.

The device can be moved around like a regular motor vehicle since its frame is actually similar to a truck chassis. The device is adapted to be moved by means of the drive transmission 27 operated by motor 26 through belt 32 and master shaft 24. A steering wheel 38 (Figs. 2*a* and 3) is provided on a steering column 40 and a seat 42 is provided on the frame in back of the steering wheel 38.

The transmission 36 is connected to the master shaft 24 by a drive belt 44 (2*b*) passing over pulleys 47 and 37 on the transmission shaft 46 and on the shaft 30 respectively and through the clutch 28. A clutch 48 is adapted to connect the shaft 46 from the transmission 36 to a pulley or sprocket 50, which is adapted to be used as a power take off where desired.

A gear shaft lever 52 and clutch lever 54 (Fig. 3) are provided for the transmission and motor clutch respectively. The drive shaft clutch lever for clutch 48 is provided at 56. A brake pedal for the vehicle is shown at 58. A roller 59 (Fig. 2*b*) is positioned above the shaft 46 between transmission 36 and clutch 48, and a roller 61 (Fig. 2*a*) is positioned on the opposite side of the transmission 36.

The transmission 36 is provided with a shaft 60 on which is positioned a pulley 62. A drive belt 64 connects pulley 62 to a pulley 65 on a winch drive shaft 66 positioned in bearings 68. The shaft 66 is adapted to be connected to a shaft 70 by a clutch 72 and to a shaft 74 by a clutch 76. The shafts 70 and 74 are held in their respective bearings 78 and 80.

The clutch 72 is operated by a crank lever 82 through a cable 84 and a clutch lever 86. The clutch 76 is operated by a crank lever 88, cable 90 and clutch pedal 92. The shaft 70 is also provided with a brake 94 operated by a cable 96 and a brake pedal 98. The shaft 74 is, in its turn, provided with a brake 100 operated by a cable 102 and a brake pedal 104.

The shafts 70 and 74 are provided at their respective ends with bevel gears 106 and 108 which respectively mesh with bevel gears 110 and 112, the gear 110 being positioned on a shaft 114 of a winch 116 and the gear 112 being positioned on a shaft 118 of a winch 120. These winches are positioned under a platform on the frame consisting of a plurality of slats 122 mounted on cross-bars 123. A roller 45 (Fig. 2*b*) is provided at the motor end of slats 122. Each winch is provided with a cable, as at 124 and 126 (Figs. 2*a*, 3 and 4). These cables pass beneath the slats to their respective pulleys 128 and 130 which are positioned endwise of the frame. The pulleys 128 and 130 are mounted for rotation on a shaft 132 mounted in bearings 134 on supports 136.

The cables 124 and 126 then pass upwards over respective pulleys 138 and 140 which are mounted for rotation on a shaft 142 which is positioned on top of a boom 144 formed by a pair of laterally inwardly-inclined beams 146. The beams 146 are supported by links 148 at the bottom ends thereof; these links being hingedly connected to the frame, as at 150. By means of these pivoted links, the boom can be folded over onto the frame, in horizontal position, to make the device more compact for movement. A hook 151, best shown in Fig. 3, hooks over shaft 132 to hold the beams in upright position.

The cables 124 and 126, after passing over the top pulleys 138 and 140, pass between the sides of a bracket 152 to which are connected a pair of idler pulleys 154 and 156. The cable 124 passes under idler 156 and over a pulley 158, the end of this cable being attached to a clevis 160 connected to idler 154. The cable 126 passes over idler 154 and terminates in a loop 162. The pulley 158 is mounted in a clevis 164 which has a cable 166 adapted to be attached to a tree-trunk. An idler roller 168 (Fig. 2*a*) is provided underneath the platform formed by the slats 122, this roller acting to maintain the tension on the cable 124.

The group of slats 122 is inclined upwardly and outwardly, as best shown in Fig. 4, and positioned thereon is a support platform 170 which extends in an upwardly defined lateral direction, as determined by the slats 122, from the center of the frame defined by the guide rails 171 (Fig. 2*a*). A support extension 172 (Fig.

4) is hinged to the outer edge of the platform **170** and can be folded over onto the platform **170** when not in use. At the center of the frame, between the guide rails **171**, is provided a roller system to be hereafter described.

The main drive shaft **24**, as it extends back from the motor **26**, is provided with a pulley **173** (Fig. 2*a*) over which travels a drive belt **174**. The belt **174** also travels over a pulley on a shaft **176** mounted in bearings **178**. This shaft **176** is adapted to be connected to another shaft **180**, mounted in bearings **182**, by means of a clutch **184**. This clutch **184** is actuated by a lever **186** which is, in turn, pivotally actuated, through a rod **188**, by an L-shaped crank arm **190** which is pivoted to the frame at **192** and connected at its upper end, by means of a pin-and-slot connection **193** to a control rod **194**. A spring **196** acts to bias the rod **194** to the right, as viewed in Fig. 2–*a*. A locking cam **198** is provided on the rod **194** intermediate its ends, a bumper on stop **200** is provided at the free end of the rod.

The shaft **180** is provided with a bevel gear **202** which meshes with another bevel gear **204** positioned on a lateral shaft **206**. A grooved feed roller **208** is positioned at one end of the shaft **206** between bearing blocks **210** and **212**, while at the opposite end of the shaft, at the other end of a bearing support **214**, is provided a gear **216** (Fig. 4). The gear **216** meshes with a gear **218** on a shaft **220**, at the opposite end of which is provided a universal joint **222**. A rod **224** having telescopic sections **223** and **225** is connected, at one end, to the joint **222** and, at its other end, is connected, also by a universal joint **226**, to a spindle **227** extending through a bearing **228** mounted on a support **230** slidably adjustable on a standard **232**. A support or brace **233** (Fig. 3) is provided for standard **232**. A top feed roller **234** is mounted on the spindle **227** in vertical alignment with the lower feed roller **208**.

A pulley **236** (Fig. 4) is provided on the shaft **206**, intermediate its ends, and a drive belt **238** connects this pulley to a pulley **240** on a rod **242**. The rod **242** is adapted to be connected to a rod **244** by means of a clutch **246** actuated by a lever **248** connected to a crank arm **250** which is mounted at one end of a shaft **252**. The shaft **252** has rockably mounted thereon a pair of arms **254** (Fig. 2*a*) between which is supported a control roller **256**. A spring **258** connects the crank arm **250** to the frame and acts to bias the crank into a position to raise the roller **256**. The rod **244** is connected to a disc **257**. A rod **259** is eccentrically connected to disc **257** as at **255** and acts as a connecting rod or pitman. The other end of rod **259** is connected at **263** to the slide which carries the bearing support **230** for the upper roller **234**.

The clutch **246** is, of course, of the half-revolution type whereby each time the lever **248** engages the clutch it rotates half a revolution and holds. The lever **248** is itself tripped in one direction or the other to engage the clutch and rotate it in the corresponding direction by the rocking movement of the arms **254** which are caused to rock in one direction by the downward movement of the roller **256** under the weight of the log and in the other direction by the upward movement of the roller **256** under the biasing action of the spring **258** when the log leaves the rollers **256**. In this manner, the slide, and therefore the roller **234**, is moved down when a log presses down on the control roller **256** and up when the log moves off the control roller.

Spaced from the roller **208**, longitudinally of the frame, is a roller **260** (Figs. 2*a* and 3) mounted on a rod **261** between bearings **262** on the frame guideways **264** and **266** for a chain conveyor **268**. This chain conveyor is driven by a shaft **270** which is operatively connected to main shaft **24** through bevel gears **272** and **274**, shaft **276** and belt **278**. The space between the rollers **208** and **260** is provided to accommodate the rotary saw blade **280** as it cuts through a log positioned on the rollers. The saw blade **280** is mounted on a mandrel **282** which is positioned in a frame **284**. The frame **284** is rockably mounted on shaft **24** by means of bearings **285** which permit relative rotation of the shaft **24**. A drive belt **286** passes around a pulley **288** (Fig. 4) on mandrel **282** and also passes around a pulley **290** on the main shaft **24**.

A rod **292** (Figs. 1, 2*a* and 5) has one end **294** adapted to lockingly coact with the locking cam **198**. The opposite end of the rod **292** is provided with an extension **296** and, at the end of this extension, is a saw-frame lock comprising a hook **298** which is adapted to engage around saw frame **284**. A spring **300** biases the hook **298** into gripping position around the saw frame.

At the area of the lower ends of the two legs of the saw frame are provided a pair of hooks **302** and **304**, the hook **302** having a single hook portion **302***a* and the hook **304** having two oppositely disposed hook portions **304***a* and **304***b*. These hooks are respectively connected to laterally extending levers **306** and **308**. The lever **306** is, in turn, connected to an eccentrically mounted pin **310***a* carried by a disc **310** which is, itself, connected to a shaft **312**. The shaft **312** is adapted to be connected to a shaft **314** by means of a clutch **316**. The clutch **316** is operated by means of a crank lever **318** connected to the lever **308**. A drive belt **320** connects a pulley on shaft **314** to a pulley on the main shaft **24**.

The saw frame **284** is biased by its own weight toward the position where the saw makes a cut in the space between rollers **208** and **260**. However, it is retained in inoperative position away from this space by hook **298**.

In operation, the device is driven into the woods where trees are to be cut. The device is then set in position and the pulley **158** is pulled out about 500 feet or more and the cable **166** is anchored to a tree in the woods. The pulley **156** rolls on top of the cable **124**, to and from the woods, to decrease the slack in the winch cables. The cable **126** operates through pulley **154**, to which loop **162** is connected.

After the pulley **158** is in position, the operator stops winch drum **72** but permits drum **120** to remain in gear. This plays out the cable **126** so that the men in the woods have sufficient play in the cable **126** to enable them to manipulate it while they attach the loop **162** to a log. At this time, the idler **168**, underneath the platform, acts to maintain cable **124** in taut condition.

After the loop is attached to the log, the winch drum **120** is operated to haul the log onto the platform **170**. As the log moves onto the platform, it bears on roller **45** which aids its movement longitudinally of the platform as it moves toward the saw end of the device.

A man stands on the platform and releases the log from the loop. The log then rolls laterally down the inclined platform **170** onto the feed rollers between the guide rails at the center of the frame. The saw frame is locked in its inoperative position at this time and the lower feed roller **208** is in motion, while the top feed roller **234** is in raised position to permit passage of the log into position.

When the log rolls down onto the feed roller **208**, it also rolls onto the control roller **256**, thereby depressing it. This acts to rock rod **252** which acts through link **250** to operate the clutch lever **248**, which, thereupon releases clutch **246**. This permits roller **234** to drop down onto the log. The log is then pulled along by the top and bottom feed rollers until the front end of the log contacts bumper **200**. As the bumper is pressed back, the rod **194**, connected thereto, pivots lever **190**. This moves rod **188** to actuate lever **186** which releases clutch **184**. This disengages the upper and lower feed rollers from the driving mechanism. At the same time, the cam **198** moves out of the path of the finger **294** on rod **292**. This permits spring **300** to pull the hook **298** away from the saw-frame **284**, thereby permitting the rotating saw **280** to swing down by gravity and make a cut through the log in the area between the rollers **208**

and 260. The cut-off piece of wood then falls onto the conveyor 268 which carries it away to an unloading station.

As the saw frame swings down, it contacts one hook portion 304*a* of the hook 304. This operates lever 308 which actuates clutch lever 318 to engage clutch 316. This rotates disc 310 and its associated eccentric 310*a* to move lever 306 to pull hook 302 against the saw frame. The hook portion 302*a* then lifts the saw-frame back to its inoperative position. As it does so, the frame hits the opposite hook portion 304*b* of the hook 304 which then acts through lever 308 to release the clutch 316 and stop the rotation of disc 310.

At this time, the top of the saw-frame contacts hook 298 which pulls rod 296 back and releases rod 194. This permits spring 196 to pull rod 194 back to normal position wherein it holds the pivotal lever 190 in position to maintain the saw in its inoperative position. At this time, the hook 298 has slipped around the saw-frame and is maintained in position to hold the saw in inoperative position.

The operator of the device sits on seat 42 and both drives the device as a vehicle and operates it as a log-sawing means. By throwing transmission 36 into neutral, and engaging clutch 48 and disengaging clutch 28, the device can be driven as a vehicle by means of a belt or chain drive on pulley or sprocket 50 running to a pulley or sprocket on the wheel drive shaft.

By operating the saw by gravity feed, the cutting time will not be slowed down on small logs, nor will the saw choke on large logs, as is often the case when using power-operated swing saws.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. In a log-sawing device, a frame, a motor on said frame, a drive shaft connected to said motor, a rotary saw pivotally mounted on said frame and drivingly connected to said drive shaft, a feed roller assembly adjacent said saw, said feed roller assembly comprising a downwardly inclined platform, a lower feed roller and an upper, vertically movable, feed roller, said feed rollers being laterally positioned relative to the lower end of said inclined platform and being arranged to be commonly driven by said drive shaft, and a weight-actuated control roller adjacent the lower end of said platform and said lower feed roller, said control roller being actuatable by by the weight of a log descending thereon from said platform and being operatively connected to a crank means, said crank means being constructed and arranged to move said upper roller into a lower, operative position when a weight rests on said control roller, and to move said upper roller into an upper, inoperative position when said weight is removed from said control roller.

2. The device of claim 1 wherein said lower feed roller is drivingly connected to said drive shaft and is provided with a driven shaft operatively connected to a second shaft, said second shaft being connected to the shaft of said upper feed roller by means of a connecting shaft, said connecting shaft being connected to both said second shaft and to the shaft of said upper feed roller by means of universal joints.

3. A self-propelled log-sawing device comprising a frame mounted on wheels, a motor on said frame, a master shaft operatively connected to said motor, means operatively connecting said master shaft to said wheels, a log-sawing mechanism operatively connected to said master shaft, said mechanism including feed means, a sawing means and a conveyor means for removing cut log sections, all said means comprising said log-sawing mechanism being synchronously operated by said master shaft and being aligned with each other to move a log in a unitary path from said feed means to the end of said conveyor means, said feed means including feed rollers constructed and arranged to clampingly engage a log, move it along said unitary path and then release it in synchronism with said sawing means, and a feed platform laterally arranged relative to said feed rollers and inclined downwardly with its lower end adjacent said feed rollers, said sawing means comprising a rotary saw biased towards cutting position transversely of said unitary path, retaining means for retaining said saw in inoperative position, means actuatable by a log moving along said unitary path to first release said retaining means to permit said saw to fall by gravity to make a cut and then return said saw to its original inoperative position where it is again held by said retaining means, and said conveyor means being operative to clear said mechanism for the succeeding sawing operation upon the return of said saw to its inoperative position.

4. The structure of claim 3 wherein said saw is mounted on a pivoted frame, and said means for retaining said saw in inoperative position comprises a lineally movable hook member, having a pivoted retaining hook thereon, and wherein said means for returning said saw means includes said lineally movable hook member, a clutch member actuable by the downward swinging of the saw frame as said saw falls by gravity, and means actuable by said clutch member to move said lineally movable hook against the same frame to raise the same and hence said saw, to inoperative position.

5. The device of claim 3 wherein said feed rollers comprise a lower and upper feed roller, said upper feed roller being vertically movable into and out of a position wherein it is adapted to drivingly engage a log positioned on said lower feed roller, and control means normally holding said upper feed roller in inoperative position but actuatable by the weight of the log to release said upper feed roller into driving engagement with the log, said control means being constructed and arranged to return said upper feed roller to its inoperative position, out of engagement with the log, upon removal of the weight of the log from said control means.

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