I. ROBERTS.

SAWING MACHINE.

APPLICATION FILED OCT. 19, 1920.

1,438,786.

Patented Dec. 12, 1922.

5 SHEETS—SHEET 1.

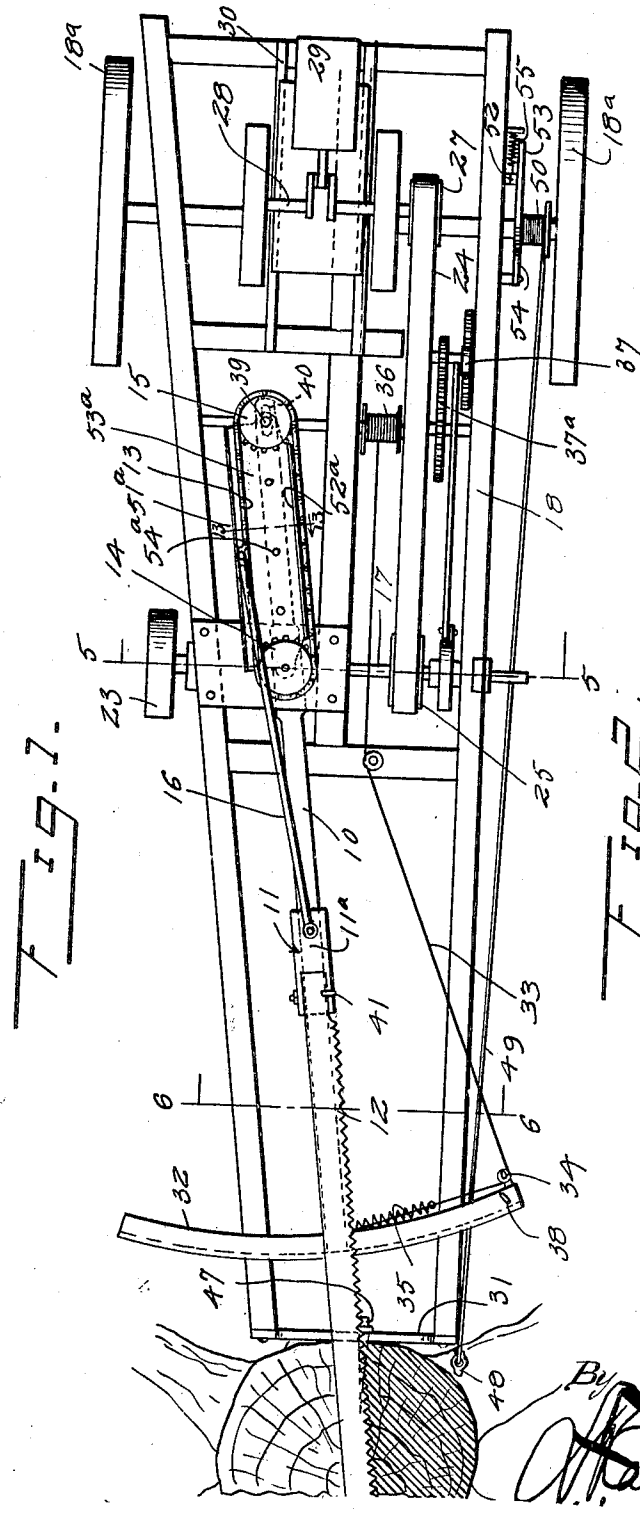


Fig. 1.

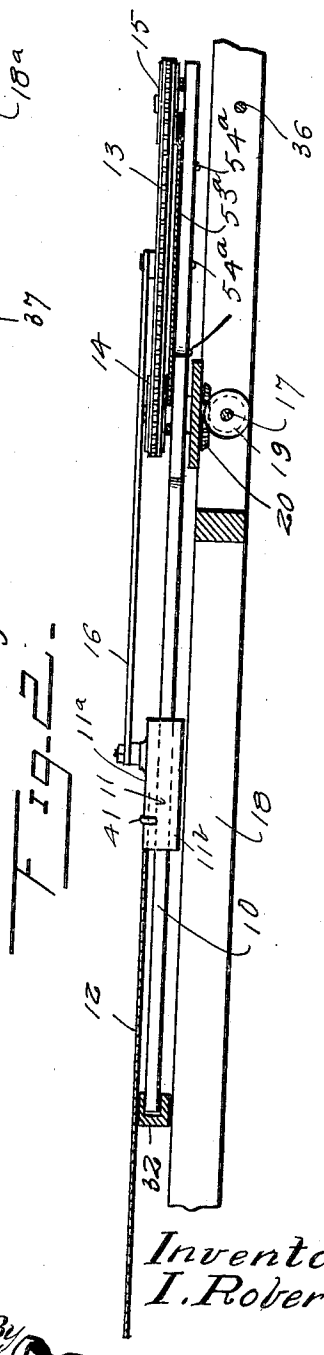


Fig. 2.

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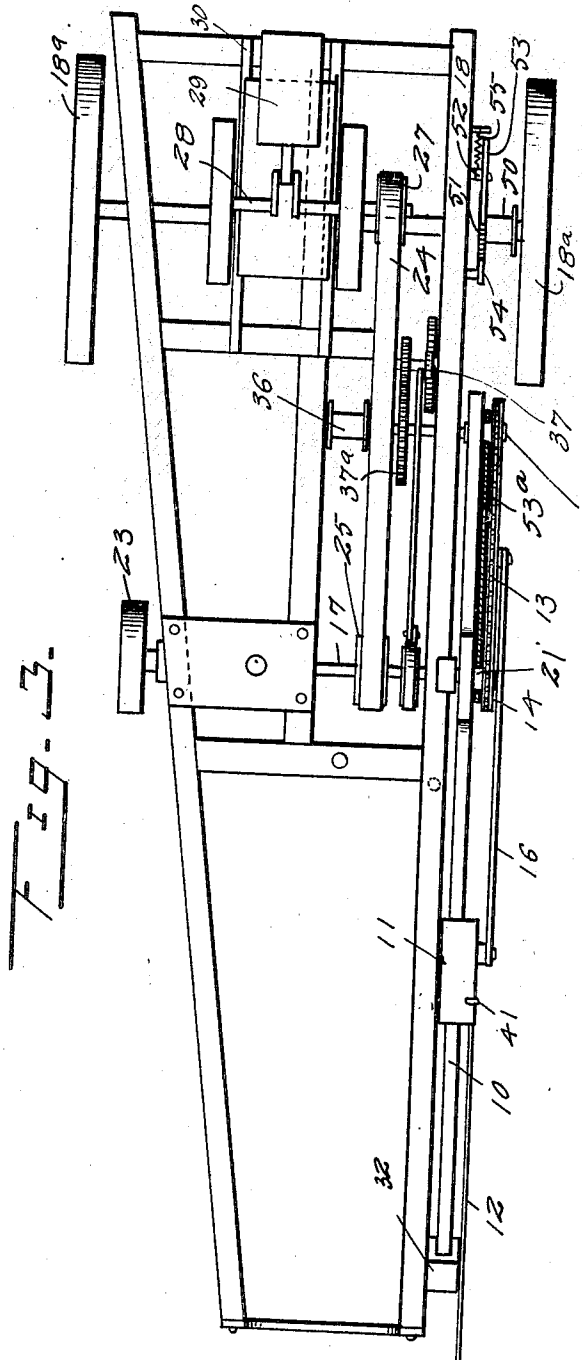


Fig. 3.

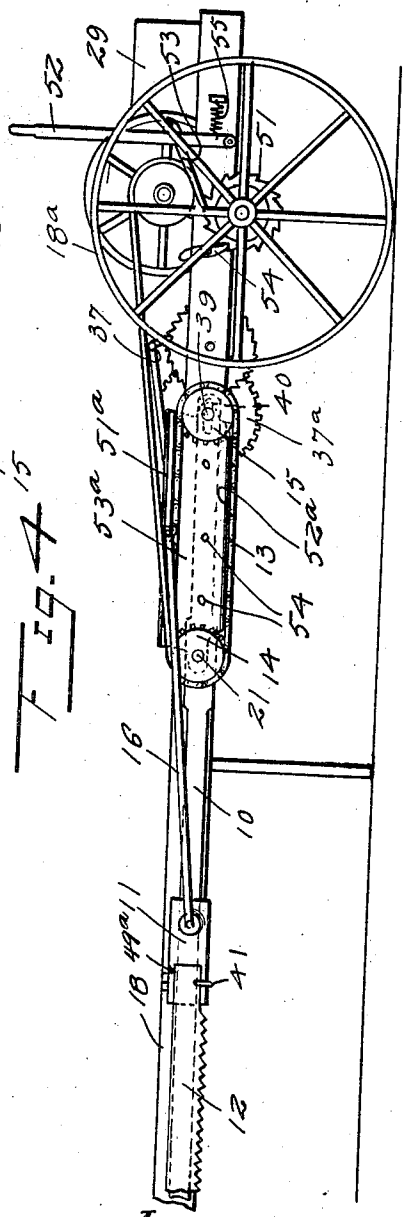


Fig. 4.

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5 SHEETS—SHEET 3.

Fig. 5.

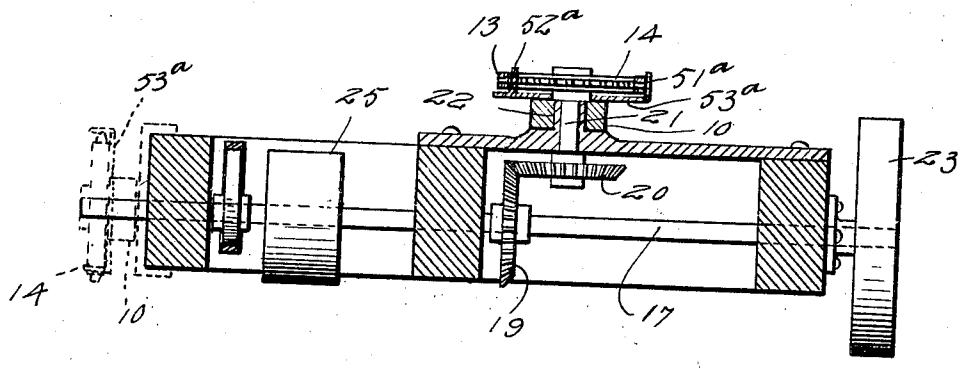


Fig. 6.

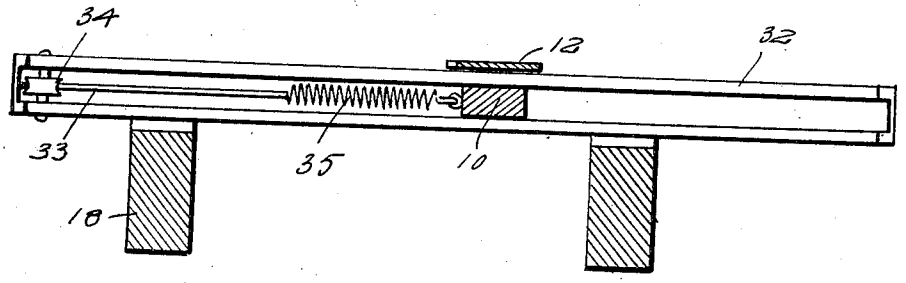


Fig. 10.

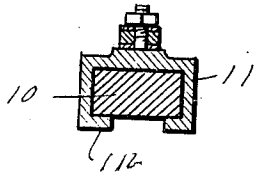
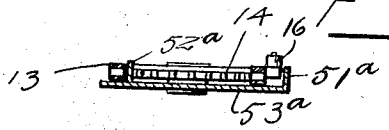


Fig. 13.



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5 SHEETS—SHEET 4.

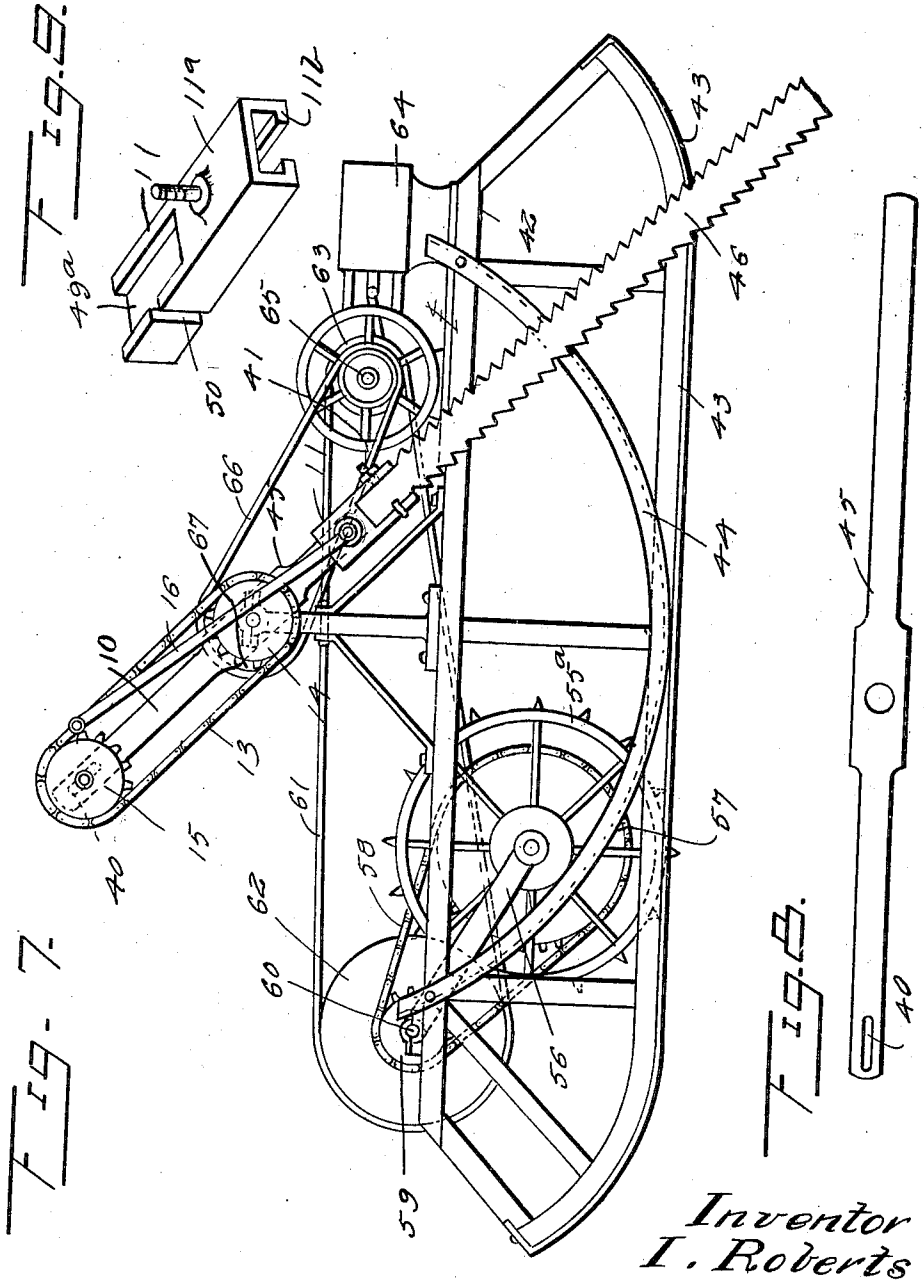


FIG. 7.

FIG. 8.

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5 SHEETS—SHEET 5.

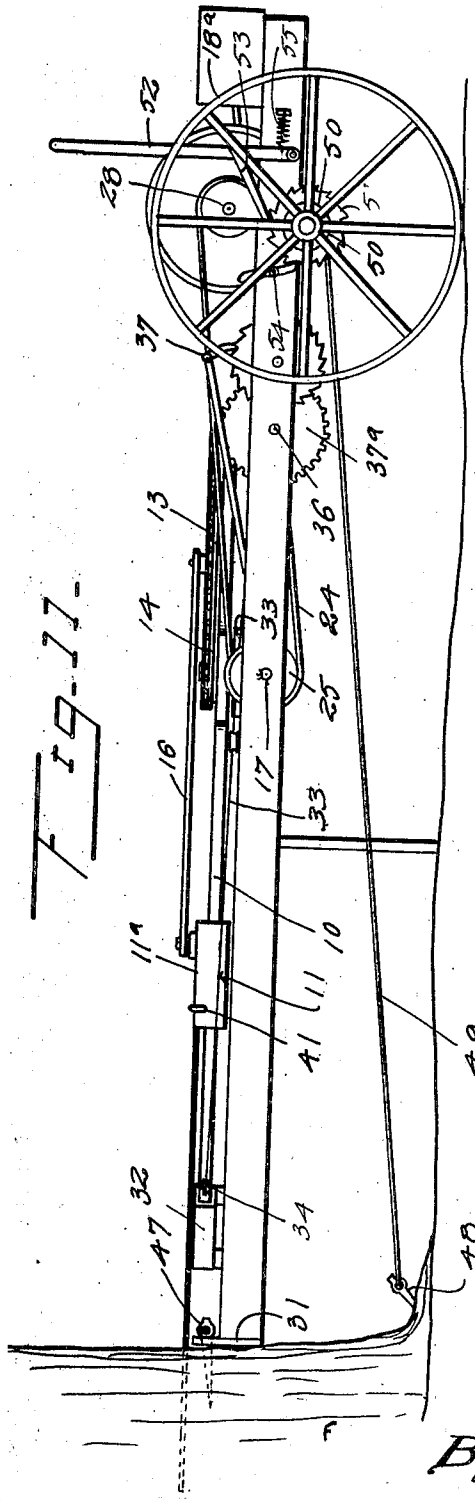


Fig. 11.

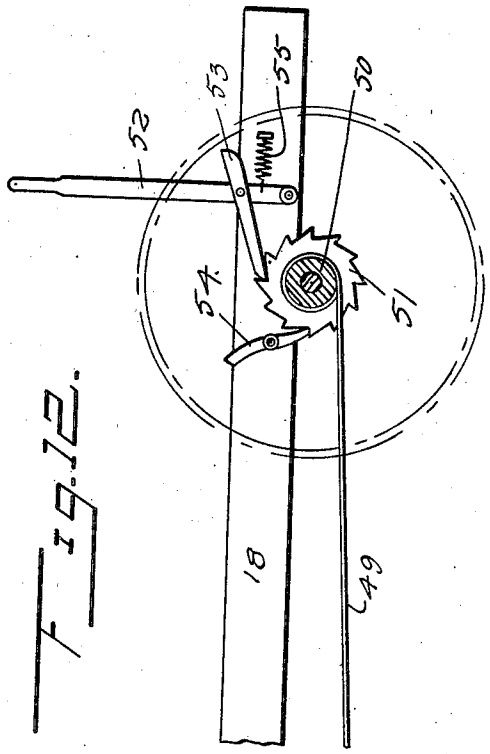


Fig. 12.

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Patented Dec. 12, 1922.

1,438,786

UNITED STATES PATENT OFFICE.

IRVIN ROBERTS, OF ST. PAUL, MINNESOTA, ASSIGNOR OF ONE-HALF TO CHARLES C. EDWARDS, OF MINNEAPOLIS, MINNESOTA.

SAWING MACHINE.

Application filed October 19, 1920. Serial No. 418,011.

To all whom it may concern:

Be it known that I, IRVIN ROBERTS, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in a Sawing Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a machine which is convertible to adapt it for use in lumbering operations both in cutting down trees and in cutting up the timber, or in other words for making either horizontal or vertical cuts, and also for cutting ice, and which may also be adjusted for use in the operation of other machines on the farm and in the shop, either incidental to lumbering and ice harvesting operations or otherwise as may be required, and with these objects in view the invention consists in a construction and combination of parts designed to secure an economy in power, a directess in drive, and a durability of structure, a preferred embodiment thereof being illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of the machine with the parts adjusted for cutting down trees or standing timber.

Figure 2 is a longitudinal sectional view of the same.

Figure 3 is a plan view showing the mechanism adjusted for making vertical cuts as in cutting up "down" timber into cord lengths and the like.

Figure 4 is a side view of the machine with the parts adjusted as indicated in Figure 3.

Figure 5 is a transverse section on the plane indicated by the line 5—5 of Figure 1.

Figure 6 is a transverse section on the plane indicated by the line 6—6 of Figure 1.

Figure 7 is a side view of the machine adjusted for ice cutting and showing the frame mounted upon runners instead of wheels as when designed for lumbering and analagous operations.

Figure 8 is a detail view of the swinging guide bar by which the saw and operating means are carried.

Figure 9 is a similar view of the cross head mounted upon the guide bar for communicating reciprocatory motion to the saw blade.

Figure 10 is a transverse sectional view of the cross head.

Figure 11 is a side view of the machine with the parts arranged as in Figure 1 showing auxiliary means for anchoring the frame to a tree.

Figure 12 is a detail view of the means for adjusting the tension of the anchoring device.

Figure 13 is a sectional view taken on the plane indicated by the line 13—13 of Figure 1.

The mechanism consists essentially of an intermediately fulcrumed guide bar or carrier 10 upon which is mounted a reciprocatory cross head 11 for carrying the saw blade 12, an endless traveler 13 consisting, in the construction illustrated, of a chain traversing drive and carrier sprocket wheels 14 and 15, said chain or traveler and the sprocket wheels traversed thereby being mounted upon the guide bar or carrier for angular movement therewith to maintain the line of travel of the chain or traveler in coincidence with that of the cross head, and a pitman 16 connecting the cross head with the chain or traveler as a means of communicating motion from the latter to the former, together with suitable means for actuating the drive sprocket wheel. In the construction illustrated the drive sprocket receives motion from a drive shaft 17 preferably mounted in fixed bearings upon a supporting frame 18 and serving to communicate motion through intermeshing gears 19 and 20 to a counter shaft 21 to which the drive sprocket is keyed or otherwise secured, the guide bar or carrier 10 being mounted upon a suitable sleeve bearing 22 concentric with said drive sprocket. The drive shaft may carry a belt wheel 23 for communicating motion through a belt to other machinery to be driven and as indicated in the drawing may be actuated by a belt 24 traversing a belt wheel or pulley 25 secured to said shaft 17 and a belt wheel

27 on the shaft 28 of the motor 29. It will be noted that a comparatively long drive belt 24 is employed, so as to avoid the disadvantages of requiring a high tension belt, and the motor may be mounted upon guides 30 so that it may be moved toward the drive shaft 17 to slack the belt when it is desired to check the movement of the saw rather than to interrupt the motion of the motor.

In the construction illustrated in Figures 1 to 4 inclusive, adapted especially for use in lumbering operations, the frame may be supported by suitable ground wheels 18ª with the forward end thereof provided with an anchor bar 31 for engagement with the tree or down timber to be cut, a segment guide 32 being supported by the forward end of the frame to receive and guide the forward end of the guide bar or carrier and also prevent undue vibration laterally of the saw blade.

In making horizontal cuts, as in cutting down timber, the saw blade may be held to its work by means of a tensioning device consisting, for example, of a cable 33 extending around a direction pulley 34 and connected with the guide bar or carrier 10 by a tension spring 35, the other end of said cable being reeled upon a drum 36 which may receive a step by step forward movement to take up the cable as the saw advances, by means of a ratchet feed mechanism 37 connected with said drum by means of intermediate gearing 37ª.

Obviously when the machine is adjusted for making vertical cuts as in dividing up "down" timber into cord lengths or otherwise, as indicated in Figure 3, the crescent bar 32 will be disposed in a vertical plane and the weight of the saw blade cross head and guide arm or carrier may be relied upon in lieu of the ratchet feed to cause the proper progressive or feeding movement of the saw, limited when the saw has passed through a given timber by means of a suitable stop 38 arranged near the end of the crescent bar in the path of swinging movement of said guide bar or carrier.

It will be observed that the application of motion to the cross head which carries the saw blade is substantially in the line of movement of the cross head and saw blade regardless of the position or path of movement of the latter, due to the fact that the traveler which actuates the pitman is movable to correspond with the path of the saw-blade, and by means of a bearing stud 39 upon which the carrier sprocket 15 is mounted and which is adjustably engaged with a slot 40 in the guide arm or carrier, the desired tension of the traveler chain may be maintained to insure a proper and efficient transmission of motion. Obviously the interval between the driving and carrier sprockets and the length of the traveler chain will determine the stroke of the saw blade and may be varied to suit the conditions under which the apparatus is to be employed, the preferred length of stroke in each direction being 36 inches, so that there is a combined forward and backward stroke or travel of the saw amounting to six feet. The cross head is preferably hollow to embrace the body or forward projecting arm of the guide bar or carrier as indicated in detail in the drawings, Figures 5, 9 and 10, and is provided with a hook bolt 41 for engaging the saw blade which is thus interchangeable to suit the character of the work to be performed.

In the readjustment of the mechanism shown in Figure 7 which adapts the machine for cutting ice the supporting frame 42 upon which the operating mechanism, corresponding with that hereinbefore described is arranged, is mounted upon runners 43 at the side of which may be arranged a crescent guide 44 to be traversed by the guide bar or carrier constructed as above noted, and with this arrangement of parts the guide bar or carrier which is indicated at 45 is adapted for a pendulum movement permitting it to swing fore and aft of the supporting frame so that after a cut in one direction has been made and the saw blade 46, which is double edged as shown in Figure 7, has been lifted out of engagement with the ice, the machine may be shifted, to position it for another cut and the saw returned to engagement with the ice so as to operate on the return stroke, to avoid the necessity of an idle stroke or swinging movement of the carrier in order to position the saw for the succeeding stroke. In other words the apparatus is designed to permit of the saw operating in both directions or alternately in opposite directions as the carrier is swung forward and rearward at the side of the supporting frame.

In Figures 11 and 12 there is shown an anchoring device for holding the forward end of the machine in the proper position with relation to a tree to be cut down and which is supplemental to an anchoring spike 47 which is preferably driven into the tree through the cross bar 31 of the frame. The arrangement of the anchoring device is also indicated in Figure 1. Said device consists of an anchor pin 48 from which extends a cable or chain 49 which is reeled at its rear end upon a drum 50 provided with a ratchet 51 for operation by a lever 52 having a suitable dog 53 and adapted to be held in its adjusted positions by a locking dog 54. A spring 55 is preferably arranged in connection with the lever, and obviously by the oscillation of the latter the drum may be turned to apply the desired tension to the cable 49 to draw the frame toward the tree, and by giving the cable a

downward inclination from the drum toward the anchoring pin 48 it is possible to neutralize any tendency of the saw to cause an upward or lifting movement of the rear end of the frame.

It will be observed that both in the horizontally operating and vertically operating positions of the cutting mechanism, there is opportunity for a free unobstructed swinging movement thereof so that the saw may be properly positioned with reference to the timber which is being cut, while the reciprocatory movement of the saw is controlled by the movement of the traveler which follows and is guided by the carrier bar, said traveler having a box-like body portion 11^a flanged as indicated at 11^b for engagement with the carrier bar and is provided at one end with the saw seat 49^a which is intersected by a transverse slot 50^a for the reception of the securing bolts 41.

In order to provide against deflection of the carrier chain which traverses the sprockets 14 and 15, due to the strain applied to said chain through the pitman 16, outer and inner guides 51^a and 52^a are arranged in parallelism with the portions of the chain between said driving and carrying sprockets and are supported by a plate 53^a extending between spindles of said sprockets and secured by rivets or bolts, or the equivalent thereof extending as at 54^a through the plate and the carrier bar.

Moreover in order to provide for progressively actuating the apparatus when used as a saw cutting mechanism, there may be mounted upon the frame 42 as shown in Figure 7, a peripherally spiked driving wheel 55^a supported by a swinging frame 56 fulcrumed upon the sled frame 42, a sprocket wheel 57 carried by the spike wheel being connected by a chain 58 with a sprocket wheel 59 on the driven shaft 60 which receives motion through a belt 61 traversing pulleys or belt wheels 62 and 63 from the motor 64, said pulley 63 being carried by the drive shaft 65 which corresponds with the drive shaft 28 of the form of the invention illustrated in Figures 1 to 5 inclusive and from which shaft motion is communicated through the belt 66 to the shaft of the drive sprocket 67 for actuating the traveler 11 which traverses the carrier bar and supports the saw 46.

Having thus described the invention, what I claim is:—

1. A sawing machine including a bar, reciprocating saw-actuating means on said bar, a shaft on which said bar is fulcrumed, a shaft to which said bar is transferable, means to drive said shafts, and a driving mechanism for said reciprocating saw-actuating means to be driven from either of said shafts and carried as an entirety by said bar and transferable with said bar from one shaft to the other.

2. A sawing machine including a bar, a saw-driving cross-head slidable on said bar, a plurality of sprocket wheels journaled on said bar, an endless chain trained over said sprocket wheels, a pitman operatively connected to said cross-head and said chain, a plurality of means selectively fulcruming the said bar operable to drive one of said sprocket wheels and said bar being transferable as a unit with said parts thereon from one of said means to the other of said means.

3. A sawing machine including a bar, reciprocatory saw actuating means on said bar, driven shafts onto which said bar may be transferred from one to the other and selectively fulcrumed, a driving mechanism for said means driven from either of said shafts and carried as an entirety by said bar consisting of a driving member attachable to said shaft, a driving member on said bar in the rear of said shafts, a pitman for said means, and a driving device for the pitman operatively associated with said driving member.

4. A power drag saw comprising a frame, angularly related supports rotatably mounted on said frame, means for rotating said supports, a saw guide transferable from one of said supports to the other, a saw mounted to reciprocate on said saw guide and transferable therewith from one support to the other, saw actuating means carried wholly by said saw guide and transferable therewith from one support to the other and adapted to be actuated by the support upon which the saw guide is mounted.

5. A sawing machine having a plurality of supports, a saw for transfer from one to the other of said supports for selective pivotal and driving mounting on said supports, means to actuate said saw and for mounting selectively on said supports, said means being transferable with said saw as an entirety from one to the other of said supports, and means to drive said supports.

6. A sawing machine having a plurality of angularly disposed driving members, a saw, a driving means and a support for both transferable with said saw and as a whole from one driving member to another.

In testimony whereof I affix my signature in presence of two witnesses.

IRVIN ROBERTS.

Witnesses:
CHARLES C. EDWARDS,
EDWARD BARDON.