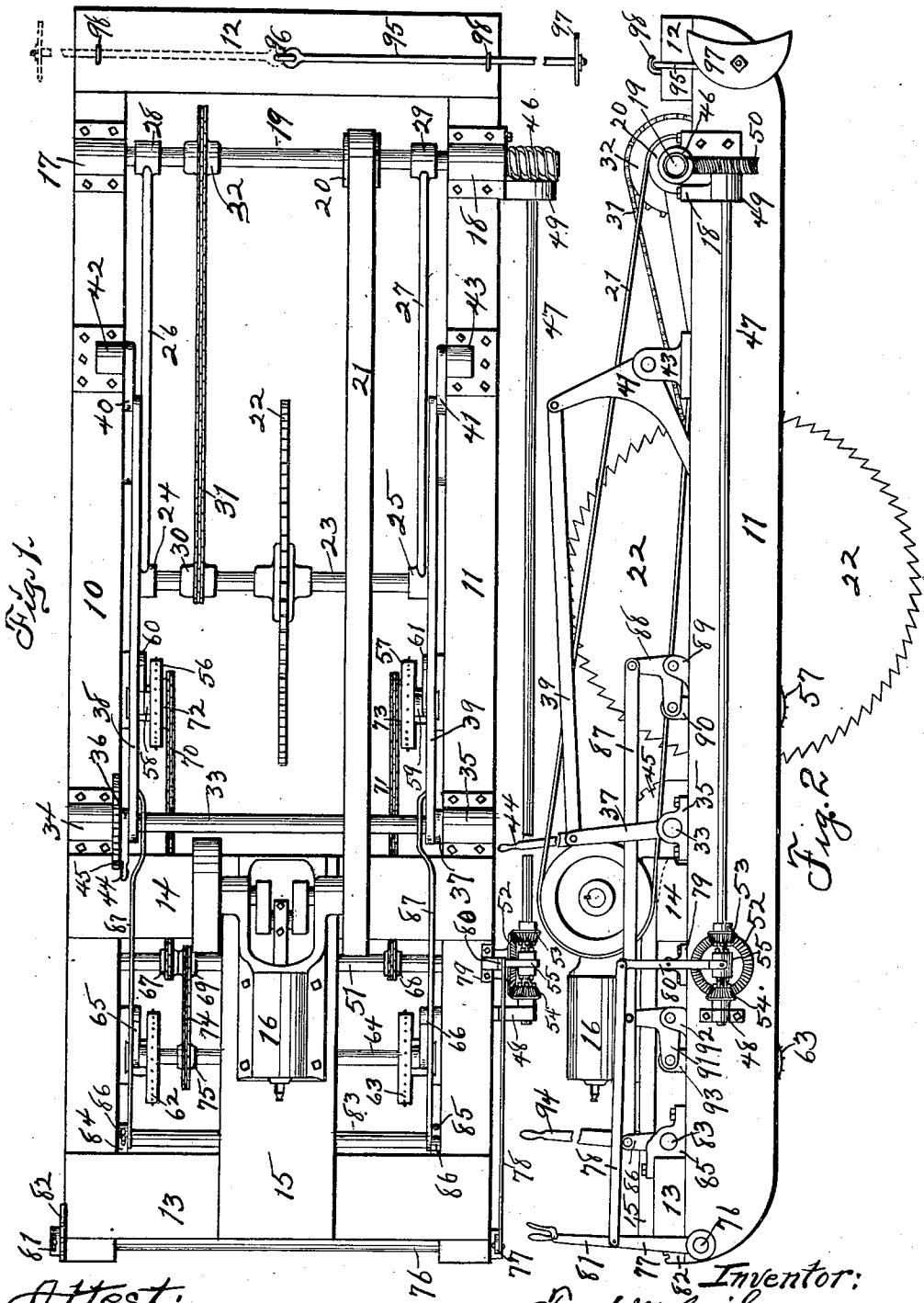


F. M. GEIL,
ICE CUTTING MACHINE.
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Attest:
Erie W. Miller
Earl M. Sinclair

74 5 12 Inventor:
Fred M. Geil.
By Allwood Mfg

UNITED STATES PATENT OFFICE.

FRED M. GEIL, OF POLK COUNTY, IOWA.

ICE-CUTTING MACHINE.

1,007,279.

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To all whom it may concern:

Be it known that I, FRED M. GEIL, a citizen of the United States of America, and resident of Polk county, Iowa, have invented 5 a new and useful Ice-Cutting Machine, of which the following is a specification.

The object of this invention is to provide an improved construction for ice-cutting machines.

10 A further object of this invention is to provide improved means for advancing an ice-cutting machine over the ice.

A further object of this invention is to provide improved means for raising and 15 lowering an ice-cutting machine.

A further object of this invention is to provide improved means for raising and lowering a saw in an ice-cutting machine.

My invention consists in the construction, 20 arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawing, in which—

Figure 1 is a plan of my improved ice-cutting machine and Fig. 2 is a side elevation of the same.

In the construction of the device as shown I employ two double-ended runners 10, 11 which are connected by cross bars 12, 13 adjacent their ends, and a cross bar 14 intermediate of their ends. A platform 15 is fixed to and centrally of the rear cross bar 13 and the cross bar 14, and a prime mover 16 is mounted on said platform. Bearings 30 17, 18 are fixed to the upper sides of the runners 10, 11 near the front ends thereof, and a shaft 19 is journaled in said bearings between the runners. A pulley 20 is fixed to said shaft 19 near the middle thereof and is 35 connected by a belt 21 with the prime mover 16 for the purpose of driving said shaft.

A circular saw 22 is mounted near the center of the machine rigidly on a short shaft 23, which is mounted for rotation in 40 bearings 24, 25. The bearings 24, 25 are carried by the rear ends of rods 26, 27 which extend forwardly therefrom just inside the runners 10, 11 and terminate in bearings 28, 29 mounted loosely on the shaft 19. Thus 45 the saw 22 is mounted for rotation between the runners 10, 11 and is capable of vertical movement through an arc relative to the shaft 19. A sprocket wheel 30 is fixed rigidly to the shaft 23 and is connected by a 50 sprocket chain 31 to a sprocket wheel 32

fixed rigidly to the shaft 19, and by this means the saw 22 is driven from the shaft 19.

A rock shaft 33 is mounted for rotation in bearings 34, 35 on the upper edges of the runners 10, 11 at the rear of the saw 22. 60 Arms 36, 37 are fixed to and rise from the shaft 33 adjacent the ends thereof, and the upper ends of said arms are pivotally connected to rods 38, 39 which extend forwardly and are pivotally connected to the upper 65 arms of bell-crank levers 40, 41 journaled in bearings 42, 43 on the upper edges of the runners 10, 11. The lower arms of the bell-crank levers 40, 41 are connected to the rods 26, 27 which support the saw shaft 23. The 70 arm 36 is provided at its upper end with a hand lever 44 for the purpose of rocking the shaft 33 and, through the bell-crank levers 40, 41, raising and lowering the rear ends of the rods 26, 27 and with them the shaft 23 75 and saw 22 carried thereby. The hand lever 44 is provided with common means of engaging with a toothed segment 45 on the upper portion of the runner 10 and holding the shaft 33 in any position in which it may 80 be placed.

The shaft 19 projects beyond the bearing 18 on the runner 11 and terminates in a worm 46 outside said runner. A shaft 47 is journaled for rotation in bearings 48, 49 on 85 the outer face of the runner 11, and said shaft extends longitudinally of said runner and terminates at its forward end in a worm gear 50 meshing with the worm 46 on the shaft 19. A shaft 51 is mounted for rotation 90 between the runners 10, 11 and said shaft 51 extends beyond the runner 11 and terminates outside said runner in a bevel gear 52. The bevel gear 52 meshes with opposing bevel gears 53, 54 mounted loosely on and 95 near the rear end of the shaft 47. A clutch 55 is keyed to the shaft 47 between the opposing bevel gears 53, 54.

Spiked wheels or creepers 56, 57 are rigidly fixed to short axles 58, 59 journaled for 100 rotation in bearings slidably mounted in blocks 60, 61 on the inner faces of the runners 10, 11, and similar creepers 62, 63 are rigidly fixed to a shaft 64 mounted for rotation in bearings 65, 66 on the inner faces 105 of said runners and near the rear ends thereof. Sprocket wheels 67, 68, 69 are fixed rigidly to the shaft 51 and the sprocket wheels 67, 68 are connected by sprocket chains 70, 71 to sprocket wheels 72, 73 on 110

the inner end portions of the short axles 58, 59 for the purpose of driving the creepers 56, 57 from the shaft 51. The sprocket wheel 69 is connected by a sprocket chain 74 to a sprocket wheel 75 fixed rigidly to the shaft 64 for the purpose of driving said shaft and the creepers 62, 63 thereon.

A rock shaft 76 is journaled in bearings in the runners 10, 11 adjacent the rear ends 10 thereof, and said rock shaft extends outside the runner 10 or 11 at either end. An arm 77 is fixed to and rises from the end of the shaft 76 which projects beyond the runner 11, and said arm 77 is pivotally connected 15 at its upper end to a rod 78 which extends forwardly therefrom in a horizontal plane.

A bearing 79 is fixed to the upper edge of the runner 11 above the end of the shaft 51 and a lever 80 is fulcrumed at its center in 20 said bearing. The upper end of said lever 80 is pivotally connected to the forward end of the rod 78 and the lower end of said lever is forked and pivoted to the clutch 55 keyed to the shaft 47.

25 The end of the shaft 76 which projects beyond the runner 10 is provided with a hand lever 81 adapted for the manual rotation of said shaft. It will be seen that a forward movement of the hand lever 81 will 30 rotate the shaft forwardly and move the upper end of the arm 77 and the rod 78 in the same direction. This will throw the lower end of the lever 80 to the rear and cause the clutch 55 to engage with the bevel 35 gear 54, while an opposite movement of the hand lever 81 will effect movement of the parts in an opposite direction and a consequent engagement of the clutch 55 with the other bevel gear 53. The hand lever 81 is 40 provided with ordinary means for engaging with a toothed segment 82 on the rear portion of the runner 10 for the purpose of holding said lever in any position in which it may be placed manually.

45 A rock shaft 83 is mounted for rotation in bearings 84, 85 on the upper inner margins of the runners 10, 11 adjacent the rear cross bar 13, and arms 86, one of which is shown in Fig. 2, are fixed to and rise from 50 said shaft. Each arm 86 is pivotally connected at its upper end to the rear end of a rod 87 which extends forwardly therefrom in a horizontal plane to a position above the creepers 56, 57. The forward end portions 55 of the rods 87 are pivoted to the upper arms of bell-crank levers 88 which are fulcrumed at their angles in bearings 89 on the upper margins of the runners 10, 11. The lower arms of the bell-crank levers 88 are pivoted 60 to the upper ends of straps 90 which slide in the blocks 60, 61 on the inner faces of the runners 10, 11, and carry at their lower ends the bearings in which the creeper axles 58, 59 are journaled. The rods 87 are also pivoted intermediate of their ends to the upper

arms of bell-crank levers 91 which are fulcrumed at their angles in bearings 92 on the upper margins of the runners 10, 11, approximately above the creeper shaft 64. The lower arms of the bell-crank levers 91 70 are pivoted to the upper ends of straps 93 which slide in the blocks 65, 66 on the inner faces of the runners 10, 11 and carry at their lower ends the bearings in which the creeper shaft 64 is journaled. One of the arms 86 75 is provided at its upper end with a hand lever 94, and thus provision is made for raising and lowering the creepers 56, 57, 62, 63 through the medium of the hand lever 94, rock shaft 83, arms 86, rods 87, bell- 80 cranks 88 or 91 and straps 90 or 93.

An arm 95 is pivotally connected at one end to an eye-bolt 96 in the middle of the front cross bar 12 and lies on the top of said cross bar. The arm 95 extends beyond 85 the runner 10, or 11, is bent downwardly, and carries on its outer end a marker 97 adapted to travel over the surface of the ice and indicate the course of the next cut, thus determining the width of the blocks of ice. 90 A hook 98 is mounted at each end of the cross bar 12 and one of said hooks is adapted to engage the arm 95 and hold the same in a position at right angles to the course of the machine.

In the practical use of this device the machine is conveyed by any desired means to a river, lake or other body of water and placed in position on the frozen surface thereof, the saw 22 having first been raised as far as 100 is permitted by the belt 21 by forward movement of the hand lever 44, acting through the rods 38 and 39 and bell-cranks 40, 41 to raise the rear ends of the rods 26, 27 and saw shaft 23 carried thereby. When it is desired 105 to employ a saw of too great diameter to be lifted clear of the ice in transporting the machine because of contact of the saw 23 with the belt 21, the prime mover may be elevated by blocking on the platform 15, 110 and it is to be understood that the showing of said saw in the drawing is conventional and may vary according to the diameter of the saw. The creeper wheels 56, 57, 62, 63 are then lowered to engage the surface of 115 the ice by rearward movement of the hand lever 94 which acts through the rock shaft 83, arms 86, rods 87 and bell-cranks 88, 91 to lower the straps 90, 93 and with them the short axles 58, 59 and shaft 64 carrying said 120 creepers. The prime mover 16 is then set in motion and drives the belt 21 and shaft 19 forwardly. The hand lever 81 is then moved rearwardly to throw the clutch 55 into engagement with the bevel gear 53 and drive 125 the bevel gear 52 and shaft 51 forwardly. This has the effect, through the sprocket chains 70, 71 and 74, of driving the creeper wheels 56, 57, 62, 63 forwardly and advancing the machine over the surface of the ice. 130

The saw 22 is then lowered by rearward movement of the hand lever 44 which acts through the rods 38, 39 and bell-cranks 40, 41 to lower the rear ends of the rods 26, 27 and saw shaft 23 carried thereby. The saw 22 is lowered gradually to a position where it will cut through the ice, and as the machine is advanced as above described, the ice will be cut into strips by successive operations of the machine along parallel lines, the course of each cut being indicated by the course of the marker 97 on the last preceding cut. A reverse or rearward movement of the machine may be accomplished by a forward movement of the hand lever 81 to throw the clutch 55 into engagement with the bevel gear 54 and drive the bevel gear 52 and shaft 51 rearwardly. This has the effect, through the sprocket chains 70, 71 and 74, of driving the creeper wheels 56, 57, 62, 63 rearwardly and causing the machine to slide backward on its runners 10, 11.

I claim as my invention—

1. In an ice-cutting machine, the combination of runners, a platform mounted on said runners, a prime mover mounted on said platform, a shaft journaled for rotation between said runners, arms loosely engaging and suspended from said shaft, bearings on said arms, a saw shaft journaled for rotation in said bearings, a circular saw on said saw shaft, driving connections between the prime mover and the first shaft, driving connections between the first shaft and the saw shaft, a shaft journaled in bearings for rotation and at right angles to the first shaft, worm gearing between the first shaft and the latter shaft, a countershaft mounted for ro-

tation between said runners, bevel gearing between the second shaft and the countershaft, creeper wheels mounted for rotation on said runners, and driving connections between said countershaft and creeper wheels.

2. In an ice-cutting machine, the combination of runners, a platform mounted on said runners, a prime mover mounted on said platform, a shaft journaled for rotation between said runners, driving connections between said prime mover and said shaft, arms loosely engaging and suspended from said shaft, bearings on the lower ends of said arms, a saw shaft journaled for rotation in said bearings, a circular saw on said saw shaft, driving connections between the first shaft and the saw shaft, means for raising and lowering said saw shaft through an arc relative to the first shaft, a shaft mounted for rotation at right angles to the first shaft, worm gearing between the first shaft and the second shaft, a countershaft mounted for rotation between said runners, bevel gearing between the second shaft and the countershaft, creeper wheels mounted for rotation and vertical adjustment on said runners, driving connections between said countershaft and said creeper wheels, means for raising and lowering said creeper wheels, and means for reversing the movement of said creeper wheels.

Signed by me at Des Moines, Iowa, this 21st day of January, 1910.

FRED M. GEIL.

Witnesses:

S. C. SWEET,
EARL M. SINCLAIR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
