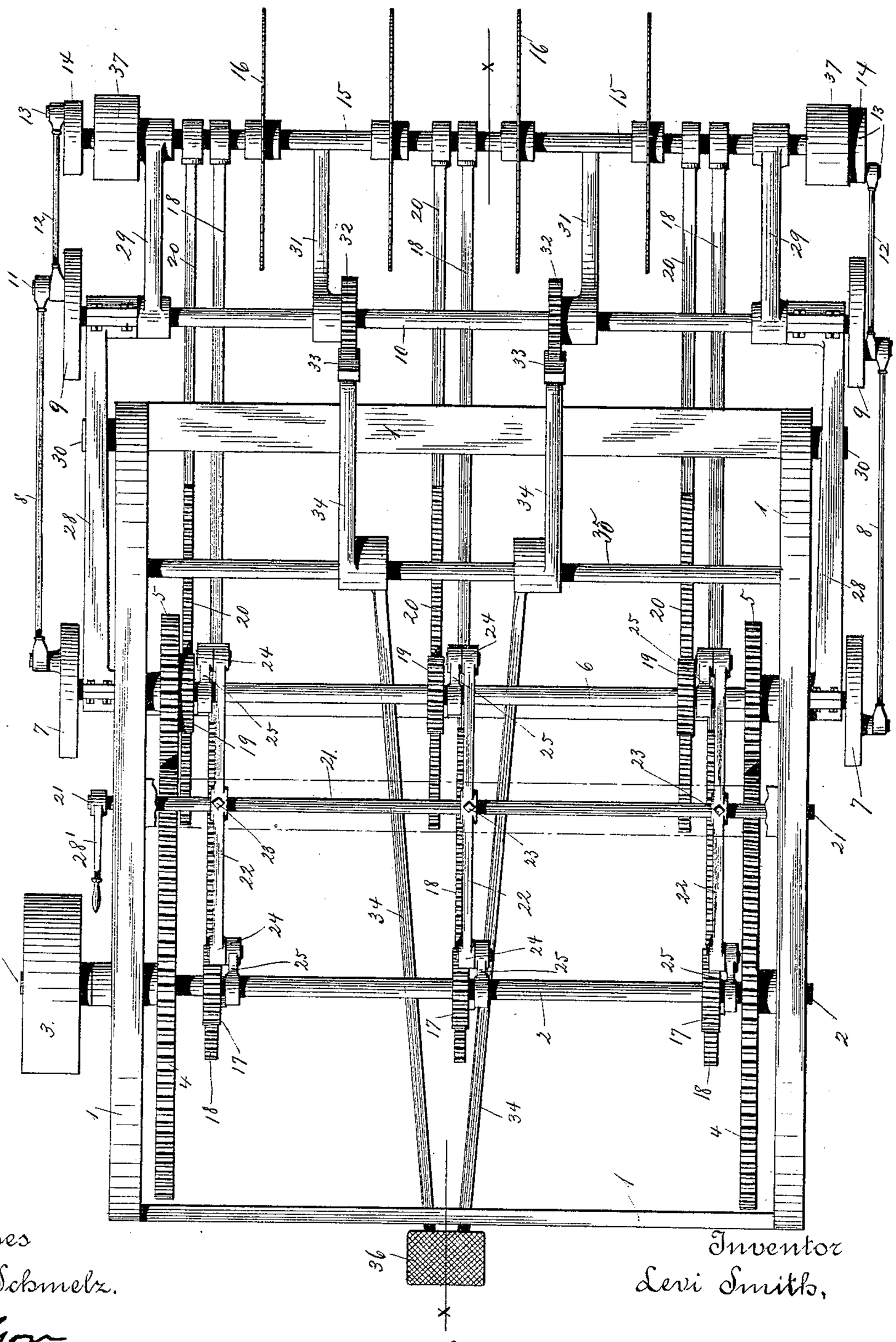
(No Model.) 4 Sheets—Sheet 1.

L. SMITH.

ICE CUTTING MACHINE.

No. 389,416. Patented Sept. 11, 1888.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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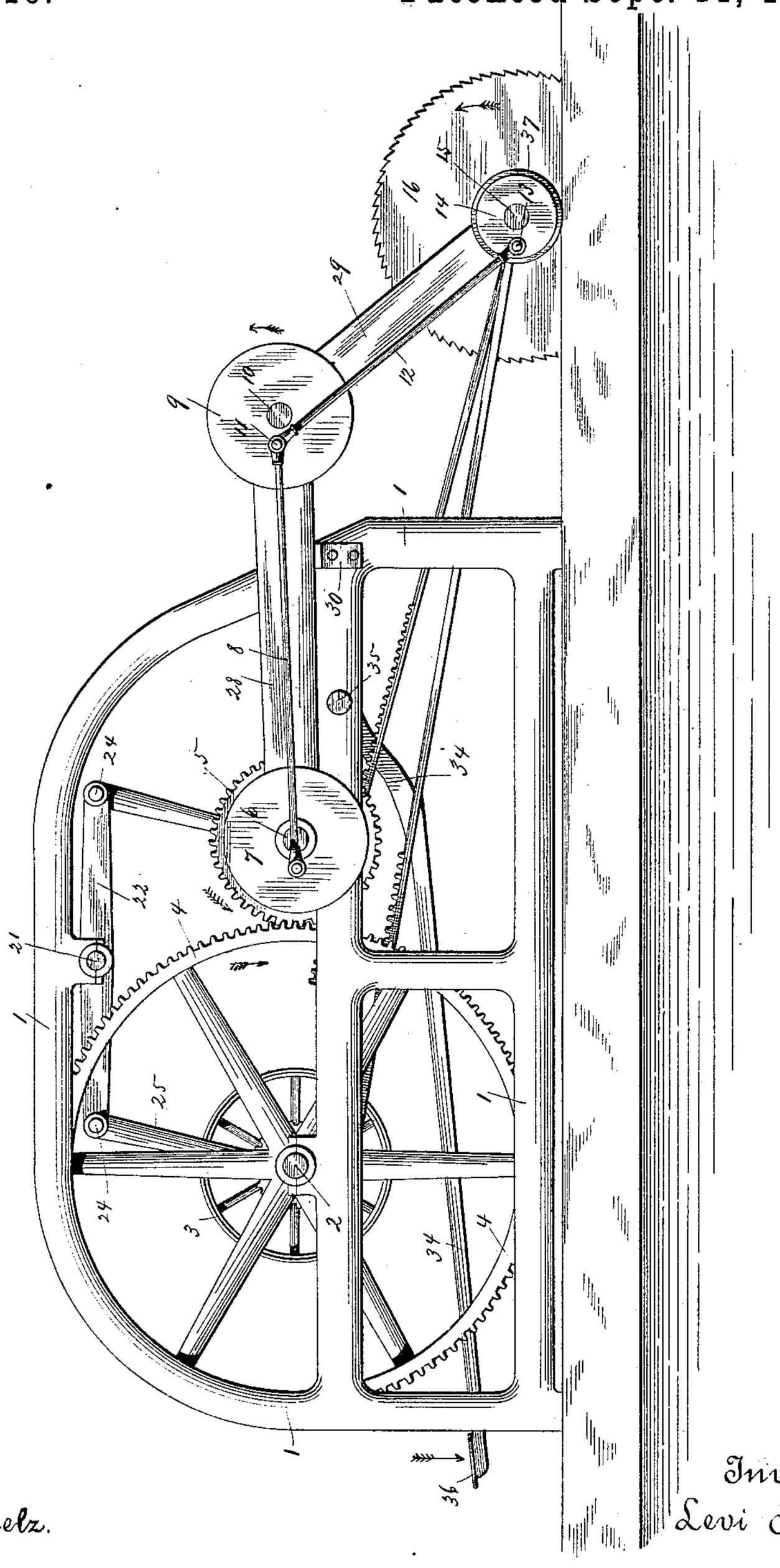
Fig. 2.



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4 Sheets—Sheet 3.

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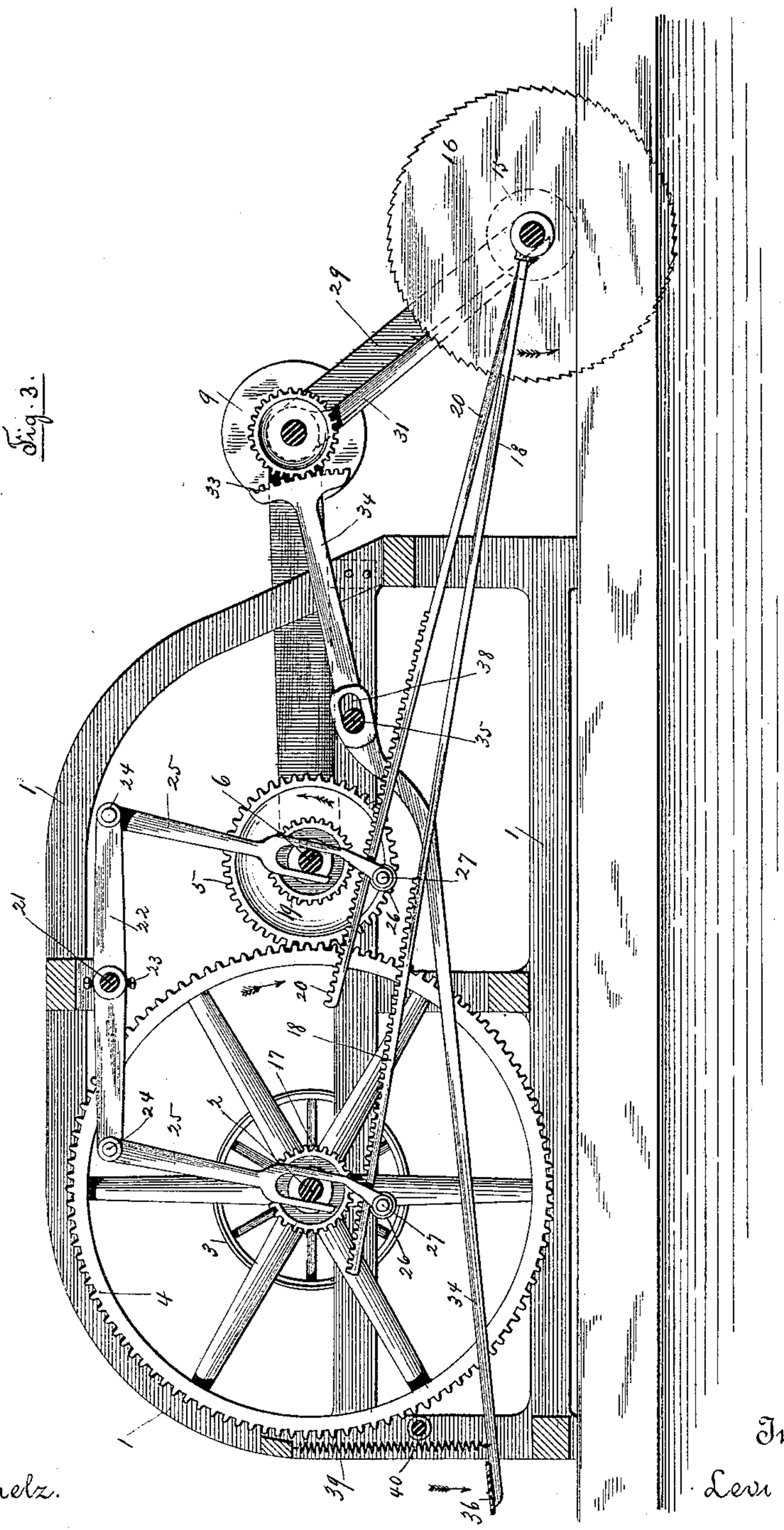
Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

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ICE CUTTING MACHINE.

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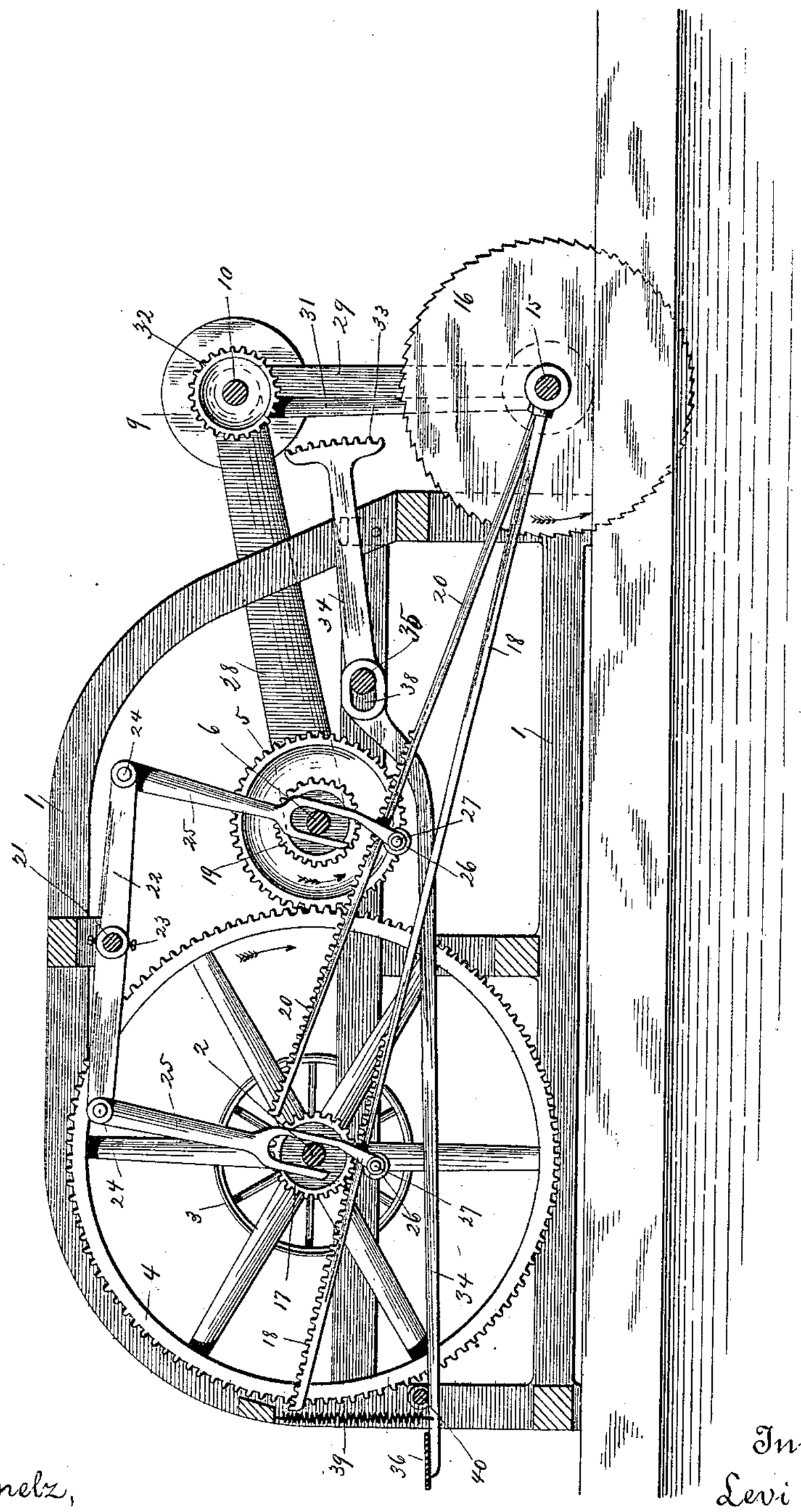
Fig. 4.



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UNITED STATES PATENT OFFICE.

LEVI SMITH, OF PAXTON, MASSACHUSETTS.

ICE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,416, dated September 11, 1888.

Application filed April 6, 1888. Serial No. 269,879. (No model.)

To all whom it may concern:

Be it known that I, LEVI SMITH, a citizen of the United States, residing at Paxton, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Ice-Cutting Machines, which, according to my knowledge and belief, has not been in public use or on sale in the United States for more than two years prior to this application, and of which the following is a specification.

My invention relates to machines for cutting ice into blocks of suitable sizes for storing; and it consists in an improved combination of mechanisms and operations, which are hereinafter fully described, embodied in a machine which is stationary during the process of cutting, and which is adapted to be moved to a new position after such cutting, as will be fully described, and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a top view of my machine. Fig. 2 is a side view of the same. Fig. 3 is a central longitudinal section on line *x x*, Fig. 1, when the saws are first lowered into the ice and the sawing into blocks begins; and Fig. 4 represents a view similar to Fig. 3, showing the parts of the machine in their position after the saws have been partially drawn in.

In the drawings, 1 represents the frame of the machine, supporting on its left end the main driving-shaft 2, upon which is secured the pulley 3, driven by any suitable power. Upon the shaft 2 are also secured the gears 4 4, which mesh into pinions 5 5, secured on the shaft 6, which has its bearing in the frame 1. At the ends of said shaft 6 are attached the crank-disks 7 7, (see Figs. 1 and 2,) driving, by the rods 8 8, the crank-disks 9 9 on the intermediate shaft, 10, which is held in proper distance from the shaft 6 by the swinging arms 28. (See Figs. 2, 3, and 4.) To the crank-pins 11 in the disks 9 are also attached the ends of the rods 12 12, the other ends of which are attached to the pins 13 13 in the crank-disks 14 14, which are secured on the arbor 15, carrying one or more saws, 16, said arbor 15 being held in proper distance from shaft 10 by the swinging arms 29. (See Fig. 1.) It will thus be seen that by turning the pulley 3 rotary motion is given the saw-arbor 15 through the gears 4 5, the crank-disks 7 9 14, and the connecting-rods 8 and 12.

On the shaft 2 I provide one or more pinions, 17, which are adapted to engage racks 18, for the purpose of feeding the saws 16 toward the machine at a comparatively low rate of speed during the process of cutting, while one or more pinions, 19, on the shafts 6 and racks 20 serve to run the saws outward at an increased rate of speed when not cutting.

In bearings at the top of the frame 1 is supported the shaft 21, carrying levers 22, which are centrally held on said shaft by set-screws 23, while at their ends 24 are pivoted the bifurcated arms 25, straddling shafts 2 and 6, respectively, and having at their lower ends rolls 26, loosely running on studs 27 and adapted to support the aforementioned racks 18 and 20, so that by partially turning the shaft 21 by means of the hand-lever 28′ either rack may be brought into engagement with its pinion, as may be clearly seen by Figs. 3 and 4, in the former of which both racks are represented in their normal and disengaged positions, while in the latter the saws are being fed toward the machine by having the pinion 17 and its rack 18 in engagement.

When running the saws outward by the pinion 19 and rack 20, the arbor 15 will be supported by the saws running on top of the ice until the swinging arms 28 bring up against the stops 30, attached to the outside of the frame, and the knuckle-joint which is formed by the swinging arms 28 and 29 and the pivot-shaft 10 is partially straightened.

In order to support the extreme weight of the saws and swinging arms, which, on account of excessive friction, would prevent the lowering of the rotating saws into the ice, I provide a lever, 31, the lower end of which brings up against the under side of shaft 15, while its upper end is pivoted on the swinging shaft 10, and is provided with a gear or segment, 32, adapted to be engaged by the teeth 33 of the lever 34, having its fulcrum on the shaft 35 extending across the frame. It will be seen that by pressing upon the end or foot plate 36 of the lever 34 the lower end of the lever 31 is caused to swing away from the shaft 15, thereby allowing the saws to be low-

ered gradually into the ice as the lever 34 is depressed, and until the weight of the shaft and saws is supported by the wheels 37 loosely turning on the arbor 15 and running on the ice. It will then be necessary to disengage the teeth 33 of the lever 34 from the pinion or segment 32 as the saw is being drawn toward the machine by the mechanism already described, and for this purpose I provide a slot, 38, in the lever 34 at its fulcrum, allowing said lever to be pulled toward the left, when a spring, 39, attached at its upper end to a girt of the frame, will cause the lever 34 to be returned to its normal position, as shown in Fig. 4, its upward movement being checked by a rod, 40. (See Figs. 3 and 4.)

As many saws as are desired may be secured to the saw-arbor, and it will be understood that the length of the arms 28 and 29 will determine the length of cut that may be made in one position of the machine, and also that practically the length of cut desired will depend in each case upon the number of saws on the saw-arbor.

I will now describe the operation of the machine. After placing the machine in position and applying power to the pulley, I turn the shaft 21 by means of the lever 28′, so as to bring the pinion 19 on the shaft 6 and rack 20 into engagement, whereby the saws will be run out on the ice until the swinging arm 28 comes to rest upon the stop 30, when by a reverse motion of the shaft 21, I disengage pinion 19 and rack 20, and by depressing the end 36 of the lever 34 allow the saw gradually to saw its way into the ice until the wheels 37 find a bearing on the surface, when I pull the lever 34 and thereby the teeth 33 out of engagement with the pinion 32. I then rock the shaft 21 so as to bring pinion 17 on shaft 2 and rack 18 into engagement, whereby the saws will be slowly drawn toward the machine, thereby cutting the ice. I now run the saws back by pinion 19 and rack 20, depress the disengaged lever 34, bring it into engagement with the pinion 32, and release the pressure on the foot-plate 36, when the spring 39 will raise the saws out of the ice, thereby clearing the machine, which may then be moved to a new position.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an ice-cutting machine, the combination of a series of saws, mechanism for raising and lowering the same in a vertical plane, said mechanism consisting substantially of levers pivoted in the frame of the machine and springs which return them to their normal position, which levers have teeth in their forward ends, and pinions which in turn are secured to levers supporting the saw-arbor, with racks and pinions, which are alternately brought into engagement for the purpose of moving the saws in either a forward or backward direction, substantially as and for the purpose set forth.

2. In an ice-cutting machine, the combination of a series of saws secured to an arbor, and racks attached to said arbor, with pinions and mechanism, as described, whereby said racks and pinions may be brought alternately into engagement, as and for the purpose set forth.

3. In an ice-cutting machine, the combination of a series of saws, racks, and pinions for moving the same horizontally, and mechanism for alternately engaging said racks and pinions, consisting, substantially, of levers supporting the racks on the under side, with levers having teeth at their forward ends, and pinions which in turn are secured to levers supporting the saw-arbor for raising and lowering the saws vertically, substantially as described.

LEVI SMITH.

Witnesses:
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