(Model.)

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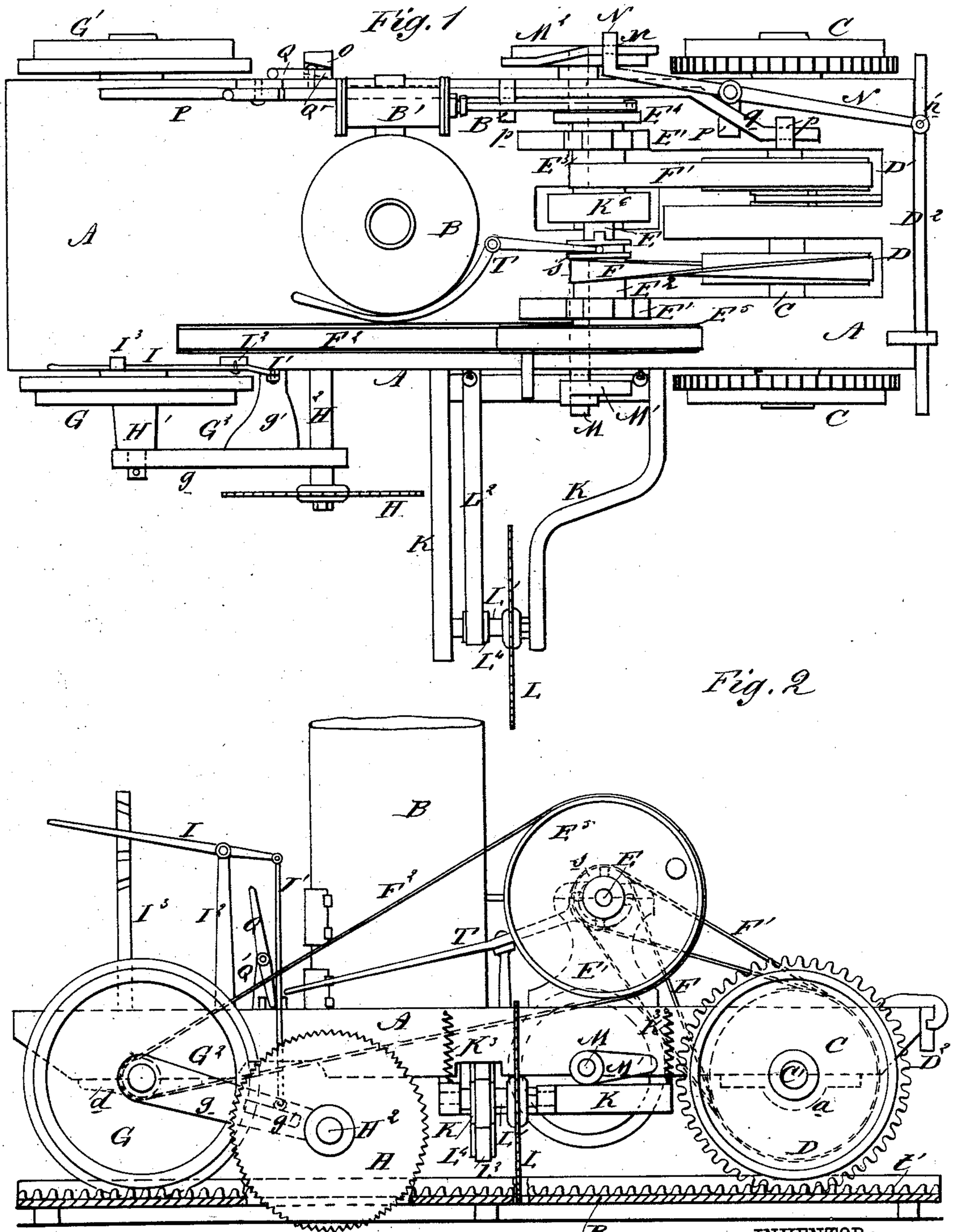
P. D. FALARDO.

ICE CUTTER.

No. 245,146. Patented Aug. 2, 1881.

Fig. 1



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(Model.) 3 Sheets—Sheet 2.

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Fig. 3

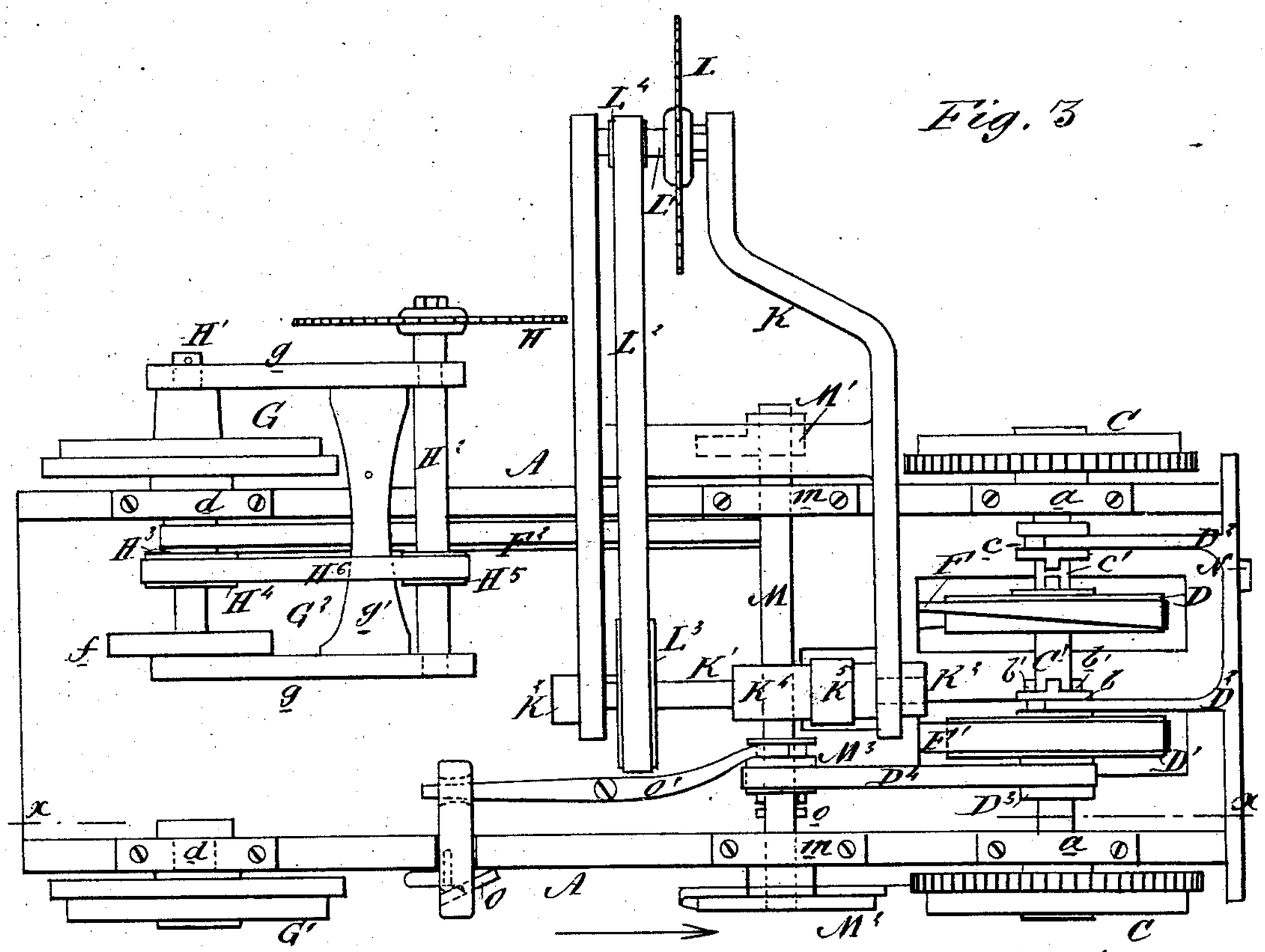
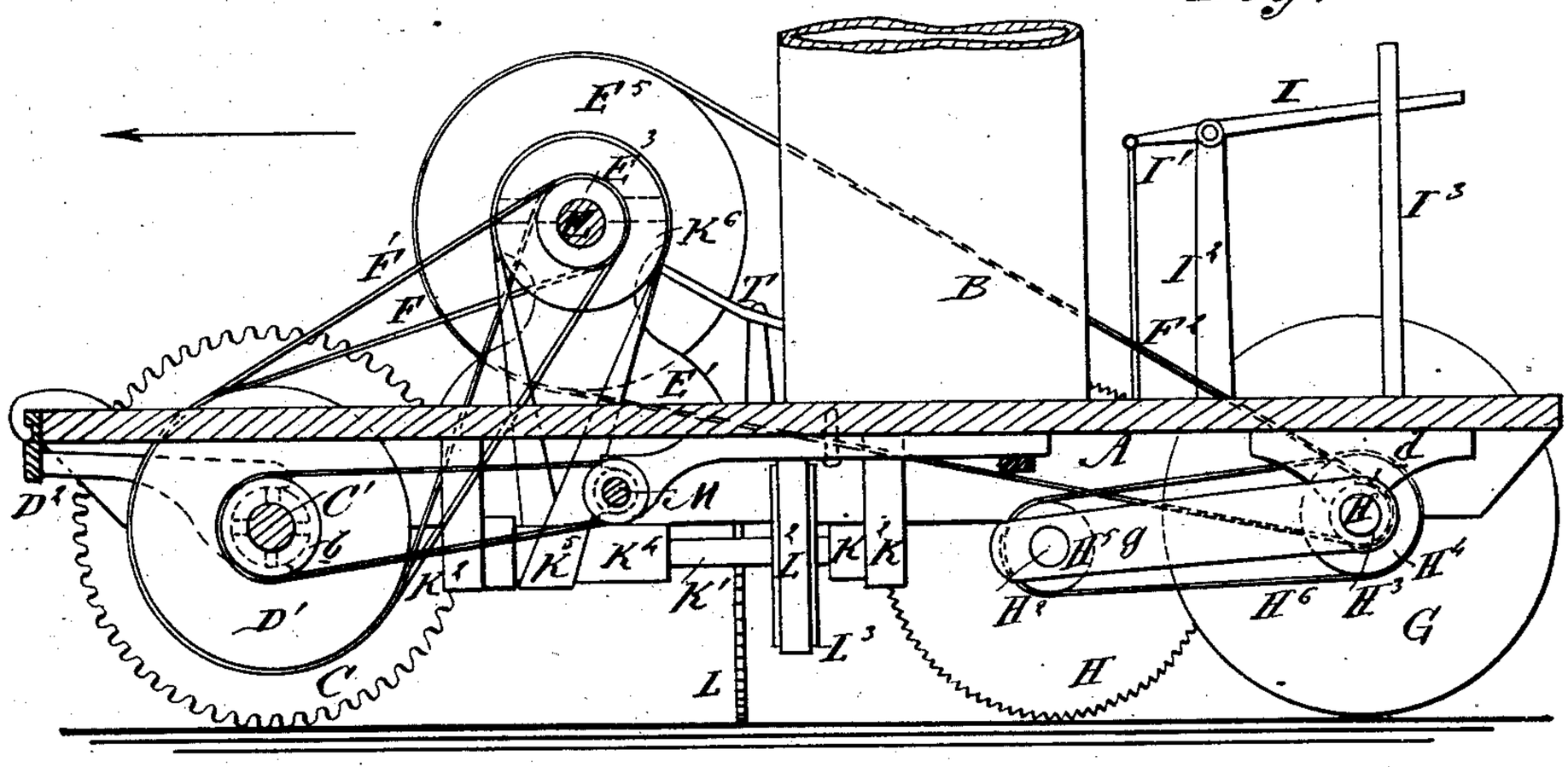


Fig. 4



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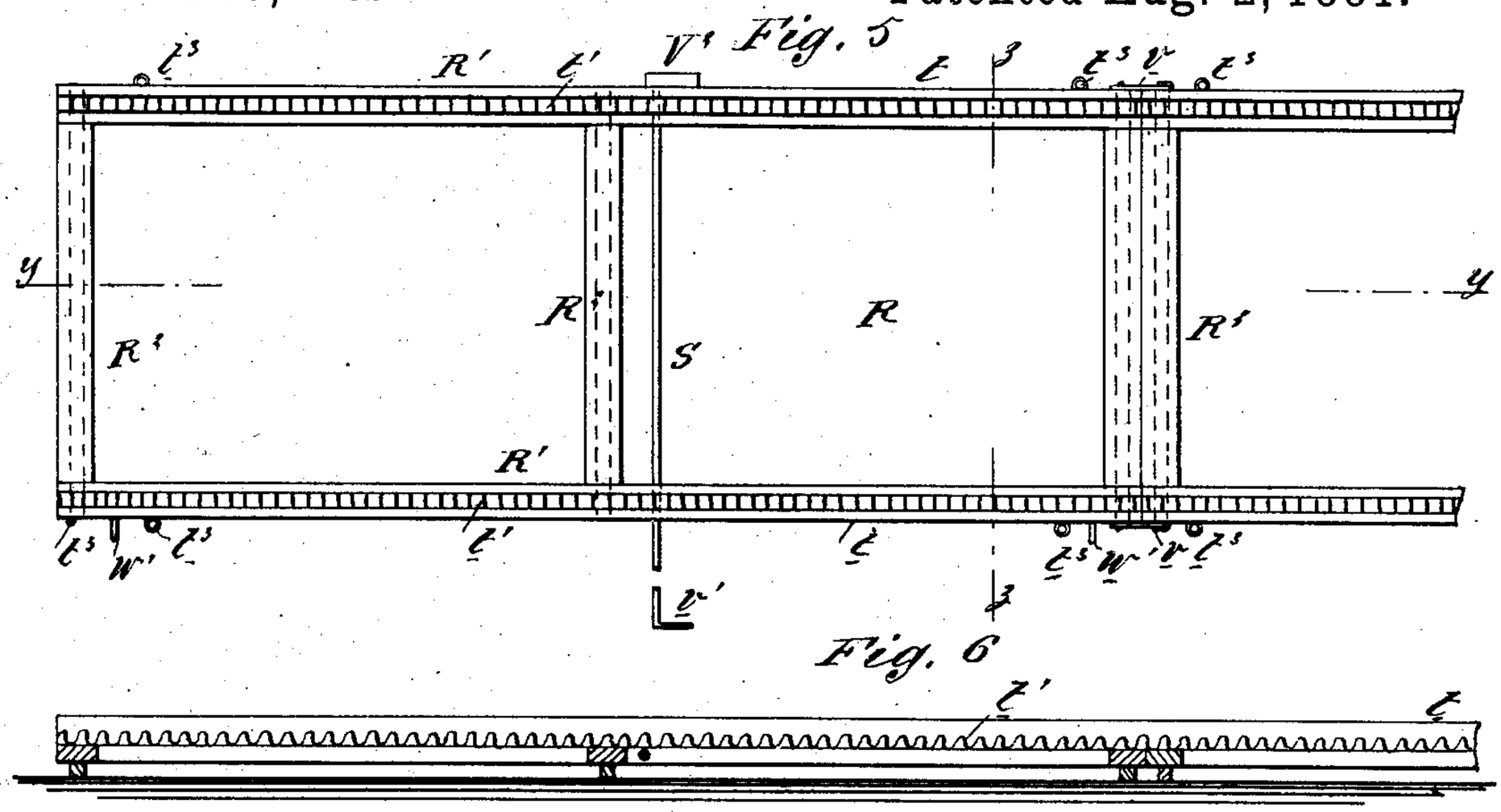

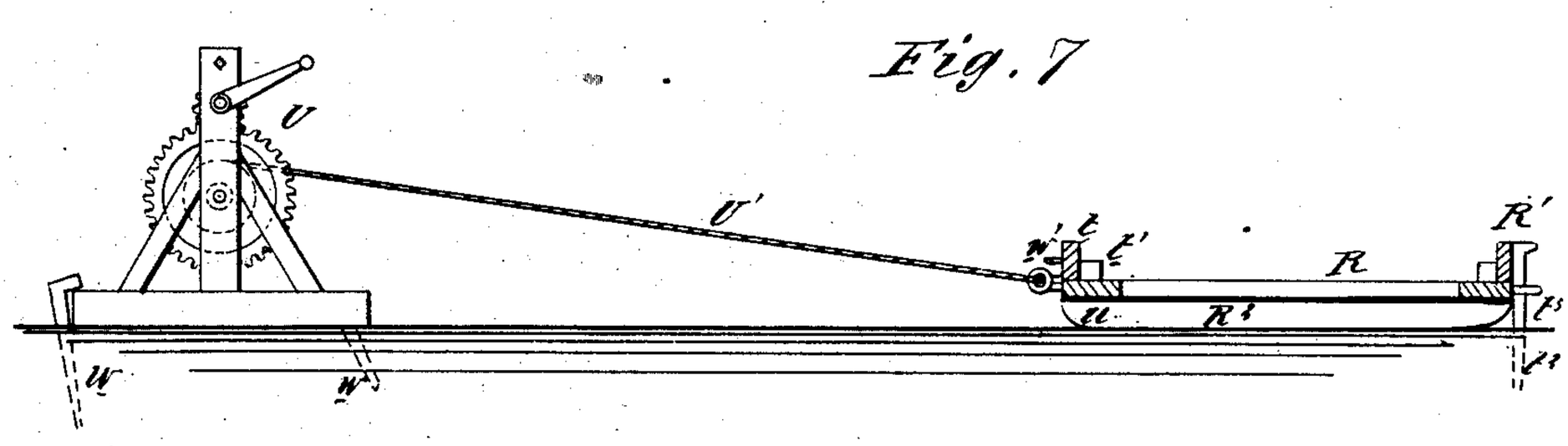

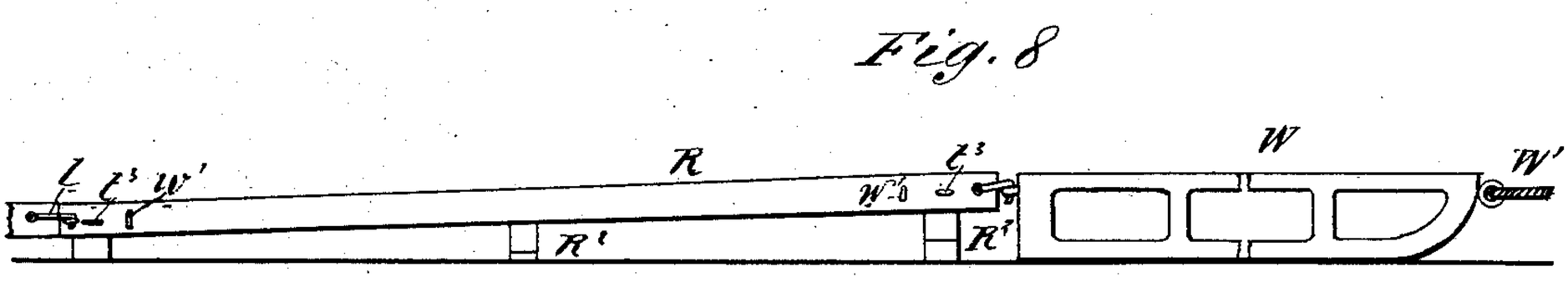

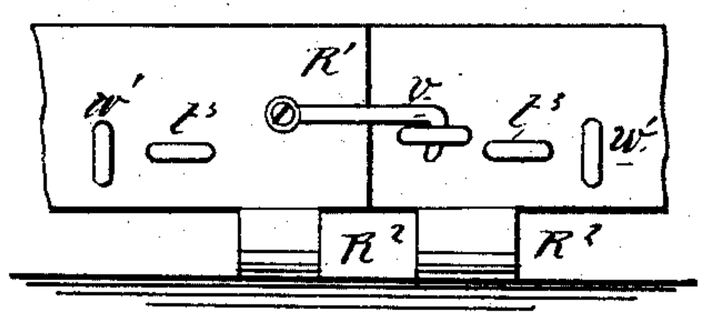

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UNITED STATES PATENT OFFICE.

PETER D. FALARDO, OF COHOES, NEW YORK.

ICE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 245,146, dated August 2, 1881.

Application filed April 28, 1881. (Model.)

To all whom it may concern:

Be it known that I, PETER D. FALARDO, of Cohoes, in the county of Albany and State of New York, have invented a new and Improved Ice-Cutter, of which the following is a full, clear, and exact description.

This invention relates to machines that are operated by steam-engines for cutting ice on ponds, rivers, and lakes; and its object is to provide an improved machine for cutting ice-blocks lengthwise and crosswise, and of a movable track and devices for moving the same sidewise while the ice-cutter is on it, and devices for transporting the cutter from place to place.

The invention consists in constructing the machine with forward driving-wheels that can be thrown in and out of gear with the driving mechanism by suitable levers, in order to start or move the machine at the will of the operator; of a device for periodically and automatically checking the movement of the machine, for the purpose of cross-cutting the ice; of devices for moving the cross-cut saw and its frame, and for stopping the revolutions of the former; of devices for moving the cutter and track together laterally; and of other novel mechanical devices and combinations, all of which will be hereinafter set forth.

In the accompanying drawings, Figure 1 is a plan of the improved ice-cutter. Fig. 2 is a side elevation of the same. Fig. 3 is a plan of the reverse of the same. Fig. 4 is a sectional side elevation on line *x x*, Fig. 3. Fig. 5 is a plan of a section of the track on which the ice-cutter operates. Fig. 6 is a sectional elevation of the same on line *y y*, Fig. 5. Fig. 7 is an end elevation of the device for moving the track and ice-cutter laterally, showing the application of the device to the track, which latter is in cross-section on line *z z*, Fig. 5. Fig. 8 is a side elevation, showing the device applied to the track for transporting track and ice-cutter. Fig. 9 is an enlarged side elevation of a joint of the track.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the frame or body of the machine, which is, preferably, rectangular and constructed in a suitable way to support the working parts. On this frame A are mounted a steam boiler and engine, B B′, that supply the motive power for the ice-cutter mechanism.

Supported in suitable boxes *a a* on the under side of the frame A, near the front thereof, is the front axle, C′, on which are rigidly secured the cogged driving-wheels C C. On this axle C′ are the two loose pulleys D D′, adapted to be thrown in or out of gear with said axle C′. The pulley D′ has a clutch, *b*, attached to it, that is designed to engage with pins *b′* in the said axle C′, and the pulley D is provided with pins *c′*, with which may engage the clutch *c*, that slides on said axle C′, said clutch devices being so arranged that the pulleys D D′ may be thrown in or out of gear with the axle C′ by means of the shifter D^2.

On the top of the frame A are two standards, E′ E′, supporting a transverse horizontal shaft, E, on which are keyed the driving-pulleys E^2 E^3, from which are extended belts F F′ to the loose pulleys D D′, the belt F, running from the pulley E^2 to the pulley D, being crossed for reversing the movement of the ice-cutter, as desired. On the said shaft E is the pulley or crank E^4, to which is connected the connecting-rod B^2 of the engine B′.

G G′ represent the flanged rear supporting-wheels of the device, having their axles journaled in suitable boxes *d d* on the under side of the frame A.

A spindle, H′, extends laterally through the hub of the wheel G, and has its outer end extending beyond the side of the frame A, while its inner end is journaled in a hanger, *f*, that is secured on the under side of said frame A. On each end of this spindle H′ are secured the swinging bars *g g*, that are held together by a cross-bar, *g′*, thereby forming a swinging frame, G^2, in whose free ends is journaled the arbor H^2 of the circular saw H, that is designed for cutting the longitudinal grooves in the ice.

On the spindle H′ is a pulley, H^3, around which is passed the belt F^2, which is driven by the pulley E^5 on the shaft E; and on this spindle H′ is another pulley, H^4, that is connected with the pulley H^5 on the saw-arbor H^2 by a belt, H^6, by means of which said saw H is driven. This frame G^2, carrying the saw H, is vertically adjustable, and hence said saw H can be raised or lowered at the will of the operator for making a deep or shallow cut,

or can be raised altogether clear of the ice by the action of the lever I and its attached perpendicular rod I′, the said lever I being fulcrumed on a standard, I^2, fastened on the top of the frame A, near a side thereof, and the lower end of the rod I′ being connected with the cross-bar *g′* of the saw-frame G^2. A rack or ratchet standard, I^3, serves for holding the lever I, and consequently the saw H, at any desired elevation.

The cross-cutting circular-saw frame K is pivoted on a shaft, K′, which is journaled longitudinally of the frame A in suitable hangers, K^2, that depend from the under side of said frame A, said frame K being extended laterally a suitable distance beyond the plane of the circular saw H, and carrying journaled in its outer end a saw-arbor, L′, on which is the circular saw L.

A spiral spring, K^3, connects the crosscut-saw frame K with the frame A, and holds the former up clear from the ice when said saw L is not required for operation.

On the shaft K′ is a pulley, K^4, and said shaft K′ is driven by a belt, K^5, connecting said pulley K^4 with a driving-pulley, K^6, on the driving-shaft E. The saw L is driven by a belt, L^2, connecting the pulley L^3 on the shaft K′ with the pulley L^4 on the saw-arbor L′.

The mechanism for forcing the crosscutting-saw L down upon the ice, and for at the same time arresting the forward movement of the ice-cutter, consists of a shaft M, set transversely across the frame A and journaled in boxes *m* on the under side thereof, said shaft M carrying on one end an eccentric cam, M′, and on the other end a cam-wheel, M^2, the former of which presses and holds down the saw L, when the shaft M is revolved, by contact with a cross-bar of the frame K, while the cam-wheel M^2 engages in a slot, *n*, in the lever N, that is pivoted on the block P′ in the top of the frame A, and has an end secured by pin *n′* to the shifter D^2, and thereby moves said shifter D^2 sufficiently to throw the pulley D′ out of gear with the axle C′, whereby the forward motion of the said axle C′ and its attached wheels C is stopped and the machine brought to a stand, while the saw L is operating to cross-cut the ice, into which it cuts until it sinks nearly to its hub, said saw L being designed to be of sufficient diameter thus to cut the usual width of a block of ice that is designed for market. Meanwhile the pulley D′ still revolving transmits its motion from its hub or sleeve D^3 by means of the belt D^4 to the sliding clutch-pulley M^3 on the shaft M, and said pulley M^3, being thrown by the operator into gear with the studs *o* in said shaft M by means of the shifter O′ and its lever O, said shaft M is revolved with the effect of causing the eccentric cam M′ to press and hold down the saw L, as stated above, which saw L, revolving, cross-cuts the ice.

The downward pressure of the cam M′ upon the crosscut-saw frame K continues during a quarter-revolution of the shaft M, and then, as the said shaft M continues to revolve, the pressure of said cam M′ is released and the frame K is raised by the action of the spring H^3, and during this movement the cam-wheel M^2, engaged in the lever N, holds the pulley D′ out of gear with the axle C′, with the effect of stopping the forward motion of the ice-cutter; but as soon as the half-revolution of the shaft M is completed the reverse spiral cam of the wheel M^2 throws the lever N in the opposite direction, thereby causing the shifter D^2 to throw the pulley D′ in gear again with the axle C′, whereby the wheels C are again revolved and the ice-cutter moved ahead for the operation of the saw H. The operator at the same time throws the clutch-pulley M^3 out of gear with the shaft M by means of the cam-lever O, and the forward movement of the ice-cutter continues.

The cam-wheel M^2 operates through the lever N and shifter D^2 only to throw the pulley D′ in and out of gear with the axle C′; and in order to bring the pulley D in gear with the axle C′ by means of the clutch *c* a more extended movement of the shifter D^2 is required, which is accomplished by means of the sliding bar P, which is held to the top of the frame A, near and parallel with an edge thereof, by boxes or guides *p*, and has its laterally-inclined end portion, *q*, embraced by a block, P′, which slides laterally in a corresponding groove in the frame A, on which block P′ the lever N is pivoted. The opposite end of the sliding bar P, extending rearward, is connected with a lever, Q, that is fulcrumed on a standard, Q′, within easy reach of the engineer or operator, so that by movement of said lever Q the sliding bar P is pushed forward or back in the block P′, and by reason of the contact of the inclined planes of the bar P at *q* and the corresponding slot or groove in the block P′ the said block P′ is moved laterally, moving with it the lever N to a greater degree than it can be moved by the cam-wheel M^2, whereby the clutch *c* is thrown in gear with the pulley D, the pulley D′ being at the same time thrown out of gear, and the motion of the ice-cutter thereby reversed; or the contrary movement of the lever Q will gear the pulley D′ and ungear the pulley D, so that the ice-cutter shall resume its forward movement.

That the motion of the crosscutting-saw L may be stopped when desired, the pulley K^6 on the shaft E is made a loose pulley, and a clutch, *s*, sliding on the shaft E, and operated by a shifter, T, affords means for throwing said pulley K^6 in or out of gear with the shaft E, and thereby causing the motion or cessation of motion of the saw L, as may be desired.

I do not confine myself to the precise construction of parts as herein shown, as it is evident that they may be modified without departing from my invention.

It will be seen that the forward wheels, C C, give motion to the ice-cutter forward or back, and that they can be thrown in or out of gear with their axle; and that the cam-wheel M^2,

through the lever N, operates to stop the motion of the ice-cutter long enough for the cross-cutting saw L to cut the ice crosswise, and that at the same time the motion of the saw H is not interrupted, so that when again applied to the ice it is moving with full velocity.

It will be observed, also, that at each revolution of the wheels C C the mechanism operates to force down the saw L to make a cross-cut.

R represents the track on which the ice-cutter moves. It is held on the ice by bars or pins t^2 driven into the ice through eyes t^3 projecting from said track R, and consists of rails R′, having outside raised edges, *t*, and teeth or cogs *t′* to correspond with the cogs of the wheels C C. The opposite rails R′ are held together by cross-bars R^2, whose ends are rounded off, as shown at *u*, that the track may be easily moved sidewise when desired, and at their points the said rails R′ are held together by hooks and staples *v* or other convenient device.

From side to side through the track R are passed rods S, having one end bent at right angles, as shown at *v′*, and a button or stop, v^2, on the other end. These rods S are designed as gages for regulating the width of the blocks of ice to be cut. When one longitudinal cut has been made parallel with the track R, and the said track and ice-machine are to be moved laterally for another and parallel cut, the ends *v′* of the rods S are inserted in the first cut made, and the track and ice-cutter moved laterally until the track is stopped against the stops v^2 parallel with the said first cut and at a proper distance from it for another cut to be made.

The mechanism for moving the track and ice-cutter laterally consists of a winch or windlass, U, which is held fast on the ice or on the shore by bars or pins *w* driven into the ice or ground, preferably at an inclination, as shown in Fig. 7, to withstand the opposing strain, and of rope or chain U′, extending from said winch U and made fast in eye-bolts *w′*, that are secured in the track R, as shown. The anchoring bars or pins t^2 being withdrawn from the ice, power is applied to the winch U, and the track and ice-cutter thereby pulled laterally as far as may be desired, winches U being fixed in proper and convenient position for such purpose.

When it is desired to remove the ice-cutter from one locality to another on the ice, a sled, W, is linked to an end of the track R, as indicated in Fig. 8, and the ice-cutter is run thereon, and then by power applied to the sled rope or chain W′ both ice-cutter and track are drawn along.

I do not confine myself to the precise construction of the ice-cutter as herein shown and described, as it is evident that it may be modified without departing from my invention—as, for instance, in the placing of suitable hoods over the saws to prevent the ice and water from being thrown upon the machine when the saws are in operation.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An improved ice-cutter, constructed substantially as herein shown and described, containing the following elements: cogged driving-wheels, in combination with a cogged movable track, mechanism for stopping the motion of the machine or giving it a forward or backward motion, as desired, a vertically-adjustable crosscutting-saw and frame combined with automatic mechanism for checking the forward movement of the cutter long enough to cross-cut each ice-block, a constantly-revolving longitudinally-cutting saw combined with a vertically-adjusting mechanism, and mechanism for connecting and disconnecting the cross-cutting saw, so that it shall be made to operate or not at the will of the operator, arranged and operating as set forth.

2. In an ice-cutter, the combination, with the driving-wheel C C, axle C′, provided with pins *b′*, and pulley D′, provided with clutch *b*, of the lever N and shifter D^2, substantially as herein shown and described, whereby the cutter is started forward or checked in its forward movement, as set forth.

3. In an ice-cutter, the combination, with the driving-wheels C C, axle C′, provided with clutch *c*, shifter D^2, and lever N, pivoted in grooved sliding block P′, of the longitudinally-sliding bar P, having inclined edges *q*, substantially as herein shown and described, whereby the motion of said cutter is reversed, as set forth.

4. In an ice-cutter, the combination, with the shifter-lever N, provided with slot *n*, of the revolving cam-wheel M^2, engaged in said slot *n*, substantially as herein shown and described, whereby said lever is made to automatically operate the said shifter, as set forth.

5. In an ice-cutter, the combination, with the main driving-shaft E and pulley E^5, of the spindle H′, vertically-adjustable swinging frame G^2, pulleys H^3 H^4 H^5, and circular saw H, arranged and operating substantially as herein shown and described.

6. In an ice-cutter, the combination, with the longitudinal shaft K′, circular-saw frame K, and crosscutting-saw L, of the spring K^3, substantially as herein shown and described, whereby said saw is held up from the ice when not in use, as set forth.

7. In an ice-cutter, the combination, with the vertically-swinging saw-frame K and saw L, of the transverse shaft M, provided with cam M′, substantially as herein shown and described, whereby said saw and frame are forced and held down for the saw to make a cross-cut, as set forth.

8. In an ice-cutter, the combination, with the vertically-swinging saw-frame and crosscutting-saw K L, respectively, transverse shaft M, provided with cam M′, slotted lever N, shifter D^2, clutch-pulley D′, and driving axle and wheels C′ C, of the cam-wheel M^2, secured on shaft M, and engaged in slot of lever N, substantially as herein shown and described,

whereby the motion of the ice-cutter is stopped while the cross-cutting saw L operates as set forth.

9. In an ice-cutter, the combination, with the crosscutting-saw frame and saw K L, shaft M, provided with cam and cam-wheel M′ M², and geared axle-pulley D′, provided with hub or sleeve D³, of the clutch-pulley M³ on shaft M and shifter and lever O′ O, substantially as herein shown and described, whereby the shaft M is thrown in gear to cause the cam M′ to force the saw L into the ice, as set forth.

10. In an ice cutter, as a means for stopping the motion of the cross-saw L, the combination, with the saw-frame K and shaft K′, provided with pulley K⁴ and driving-shaft E, of the loose clutch-pulley K⁶, substantially as herein shown and described, whereby said saw may be thrown out of gear with the driving-shaft, as set forth.

11. In an ice-cutter, the combination, with the track R, of the gages S, provided with bent ends v' and stops v^2, substantially as herein shown and described, whereby the width of the ice-blocks and lateral adjustment of the cutter and rails are regulated, as set forth.

12. In an ice-cutter, as a means of moving the cutter and track laterally, the combination therewith of the winches U, rope or chain U′, and holding-bars *u*, substantially as herein shown and described.

13. In an ice-cutter, the combination, with the track R, of the sled W, linked thereto, substantially as herein shown and described, whereby said cutter and track can be drawn longitudinally, as set forth.

PETER D. FALARDO.

Witnesses:

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