S. LEWIS.

ICE PLANING MACHINE.

No. 75,029. Patented Mar. 3, 1868.

Fig. 1.

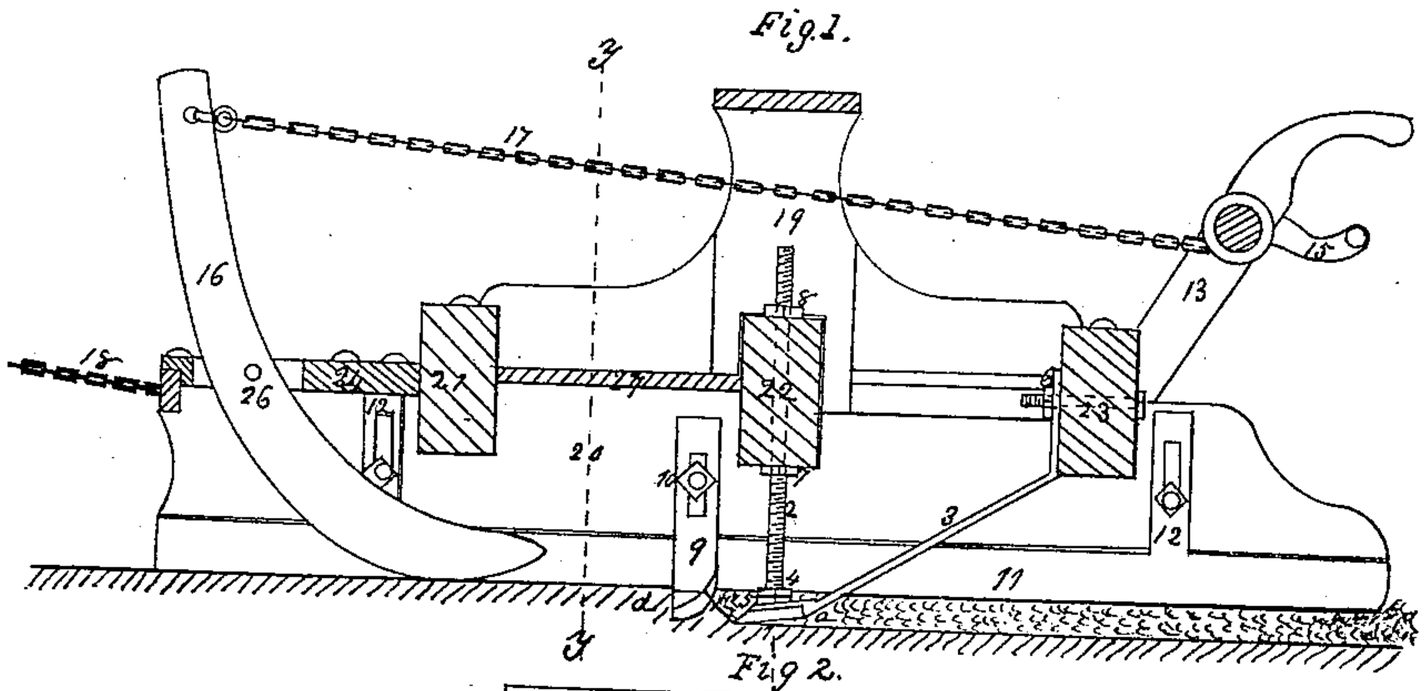


Fig 2.

Fig 4.

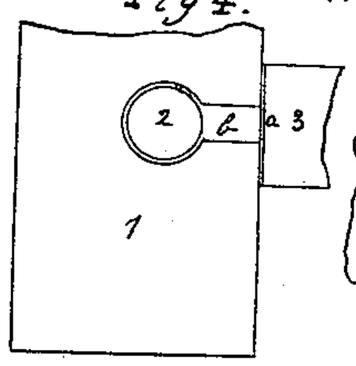


Fig 3.

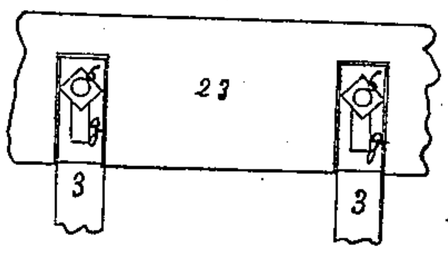
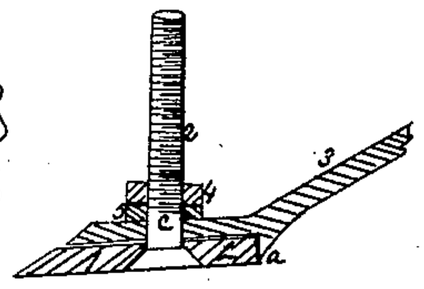


Fig 5.



WITNESSES.

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Letters Patent No. 75,029, *dated March* 3, 1868.

IMPROVED ICE-PLANING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL LEWIS, of Brooklyn, in the county of Kings, and State of New York, have invented a new and improved Ice-Planer; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

The object of this improvement is to obviate the many and serious difficulties in the treatment of the surface of ice which have heretofore been experienced by those having charge of skating-ponds or engaged in the business of cutting ice for the market.

It is a fact well known that the old ice-planer had, in most cases, its operating-edge set with the bevelled side downward, and was attached in other respects somewhat after the manner of the carpenter's plane, with but poor devices or none for changing the angle of the knife or varying the depth of its cut. In practical use, this primitive machine has always exhibited a tendency to "ride" over the inequalities it was intended to remove, while the imparting of a new and even surface to an entire pond was simply an impossibility.

In the attempt to escape from a portion of these difficulties, a load was put upon the old machine, which was only so much extra labor upon horses, with so much more danger of cracking or otherwise injuring the ice. Even in the apparatus in which the blade was set in the rational manner, the absence of other and indispensable devices rendered the machine of little utility, and very arduous to operate, since, owing to the old method of attaching the knife, a large quantity of cut ice was drawn along with the machine, the clearance of which was prevented by the beam to which said knife was attached. Moreover, in all the ice-planers heretofore made, to the best of petitioner's knowledge and belief, the knife has been set at a false angle, and in such a manner as to cause the adhesion of frozen matter to the under side of the blade, increasing the tendency to "ride" before referred to.

Such was the status of the mechanical treatment of the surface of ice when your petitioner became practically interested therein; and perceiving that the luxury of a fine surface to the skater and a lucrative business to the manager could be secured only by the great improvement of the accessory implements, he lost no time in devising and putting into practical operation the improvements herewith submitted, which have given the pond with which he is connected at the moment of the present writing the monopoly of skating in the metropolitan district of New York.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 is a vertical longitudinal section of the machine in the line of *x x*, fig. 1.

Figure 2 is a vertical transverse section of the same, taken in the line *y y*, fig. 1.

Figure 3 is a front or face view of a portion of the same.

Figure 4 is a view of the under face of a portion of the knife pertaining to the same.

Figure 5 is an enlarged view of the means by which the knife is attached to and secured in place.

Similar letters of reference indicate corresponding parts.

The principal features of this improved planer are, the knife 1, with its flat side to the ice, its greater dipping-angle, and its peculiar attachment—the latter furnishing an unobstructed escape for the cut ice; the bolts 2 2, the braces 3 3, the vertical cutters 9 9, the brake or elevator 16, and the adjustable character of all its working parts.

The frame, of any suitable timber or metal, is composed of the sides 20 20, the beams 21, 22, 23, and the top or flooring 24 and 27. Its length is such as to span any incidental hollows in the ice, thereby tending to restore to the whole pond its original plane surface. The seat is made removable, to facilitate the adjustment of the knife, and for the convenience of transportation, &c. The desired angle of the knife 1 results from the bend near the head of the bolts 2 2, and the inclination of the under face of the lower end of the braces 3 3—the taper washers 5 5 compensating said inclination, and furnishing a face parallel with that of the binding-nuts 4 4. The manner of attaching the knife is to run the bolts 2 2 through the lower ends of the braces 3 3, and run on to said bolts the taper washers and nuts 4 4 and 7 7; the bolts are then inserted through the beam, as shown, and the upper nuts 8 8 run on; the upper ends of braces 3 3 are then placed as shown in figs. 1 and 3; the bolts 6 6 inserted and the nuts run on; the knife 1 is then put in place by passing the slots *b* over the bolts 2 2; the dip or cut of the knife is determined upon, and the nuts 8 8 placed accordingly; the nuts 7 7 and 6 6 are then screwed home; and finally the taper washers 5 5 are properly placed, and the nuts 4 4 screwed down till they bind the whole cutting-apparatus together, as seen in fig. 5. As will be seen at a glance, the nuts 8 8

and slots *g g*, as shown in fig. 3, render the graduating of the cut from a mere shaving to two inches, a matter of great facility.

The vertical cutters 9 9 are placed as shown in figs. 1 and 2. These cutters, which are forced into the ice by the weight of the machine and the pull of knife 1, serve the double purpose of imparting a steady direction to the planer, and causing the planing cut to be far more easy and clean, especially in the angle at *d*, where clear surface is so much needed, both on the bottom and side of the angle, as a guide for the runner in the next cut. They are slotted towards their upper ends, as seen in fig. 1, to enable the operator to set them to the intended cut in relation to knife 1, as shown in figs. 1 and 2, and are bolted through the frame by bolts 10 10, as seen in fig. 2, from which it will also be seen that only one of the cutters is in operation at one time.

The runners 11 11* are furnished with vertical slotted projections 12 12, the slots in which are designed for a use analogous to that of those in 3 3 and 9, as shown. In operation, one runner is below the frame to the extent of the intended cut, as will be seen in figs. 1 and 2. The other runner is level with the bottom of the frame. The slots in 12 12 are the means of reversing the position of the runners in this respect, and enabling the machine to work in one or the other direction, at the will of the operator. The sides of the frame, 20 20, are cut out to a depth and width corresponding to the thickness and breadth of said runners, thereby allowing the vertical cutters a flat surface, and furnishing an admirable bracing for the projections 12 12.

The brake or elevator 16 is formed as shown, pivoted in the cross-timbers, as shown at 26, and connected at the rear of the planer by a chain, 17, with a windlass, 14, centred in the handles 13 13, so as to be readily operated by the man guiding the machine. The object of this device is to raise the horizontal and vertical cutters from this cutting position when a change of place or direction is desired, or when the operation is completed.

Such is the machine in construction, and now as to its operation.

It will be seen by reference to fig. 2, that the planer has already cut one swath or circle of the pond, viz, from *e* to *f*, and that the surface inclines in that direction in a degree due to the depth of the cut and the length of the blade. This has resulted from the relative set of the runners and horizontal knife. It will be observed also that the runner toward the bank, or on the right hand of fig. 2, is set as much below the frame as the cutters project downward on the other side; and, as the cutters can get no deeper than the runners will allow, it is plain that the end of the knife 1 toward the bank will take no hold at all, while at the other end the said knife will enter the ice till the frame on that side rests on the surface. This cut is continued till the circle of the pond has been made. When the planer arrives at the point of starting, the man guiding the machine operates the windlass 14, and, by bringing the foot of the brake 16 forward, raises the front of the planer, and it is drawn or swung over into its next position, viz, with the inner side of the runner 11* overhanging the edge or step of the last cut. The horses are then started, the knife "bites" and immerses itself in the ice till the runner 11 reaches the ice at the original level, and 11* descends to the face already cut.

The machine is now on an even keel, with the inner side of runner 11* close up to the step of the last cut, preventing the machine from warping toward the centre of the pond, while the vertical cutter 9 checks any tendency in the other direction. In short, the step of the ice *d*, seen at the left of fig. 2, will be inside the runner 11* at the next round, and so on till the whole pond has received a new face corresponding in line with that of the knife 1, as seen in fig. 2.

If the knife is to be detached, for sharpening or any other purpose, the nuts 4 4 and 6 6 are eased up and the blade withdrawn, the operation being reversed when it is replaced.

If the depth of the cut is to be altered, the nuts 6 6, 7 7, and 8 8 are to be eased, the knife set, and the nuts screwed home again, 7 7 being, of course, the last, and the vertical cutter being set to correspond.

If it is desired to change the direction of the work, that is, to have the bank of the pond on the left hand instead of the right, the runners and vertical cutters are easily and speedily reversed in position by a turn of each of their respective nuts, when one runner may be set up and the other down, and so with the vertical cutters, and all made fast again.

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

1. The adjustable knife 7, in combination with a frame mounted on runners 20 20, and all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

2. The manner of attaching and bracing the knife 1 of an ice-plane with its flat side downward, by the bolts 2 2, braces 3 3, taper washers 5 5, and nuts 4 4, substantially as described, and with the objects specified.

3. The slots *b b* in the knife 1, when in combination with bolts 2 2, braces 3 3, washers 5 5, and nuts 4 4, for the purpose explained.

4. The vertical cutters 9 9, formed, attached, and operating as described, and combined with the knife 1, and its attachments, as shown.

5. The runners 11 11*, when made reversible and adjustable as described, by means substantially as shown, and combined with an adjustable knife and vertical cutters, all as specified and explained.

6. The brake or elevator 16, in combination with the chain 17 and windlass 14, applied and arranged to operate in the manner substantially as and for the purpose specified.

The above specification of my invention signed by me, this 4th day of January, 1868.

SAMUEL LEWIS.

Witnesses:

WM. F. MCNAMARA,

ALEX. F. ROBERTS.