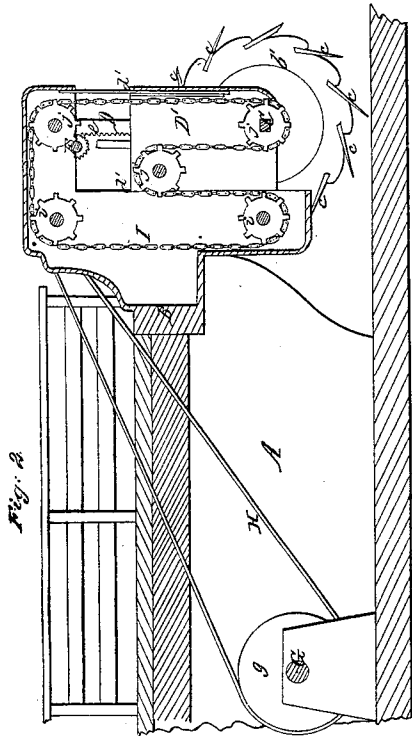
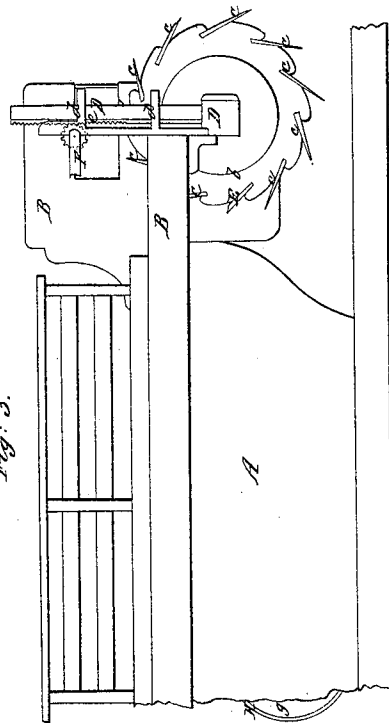
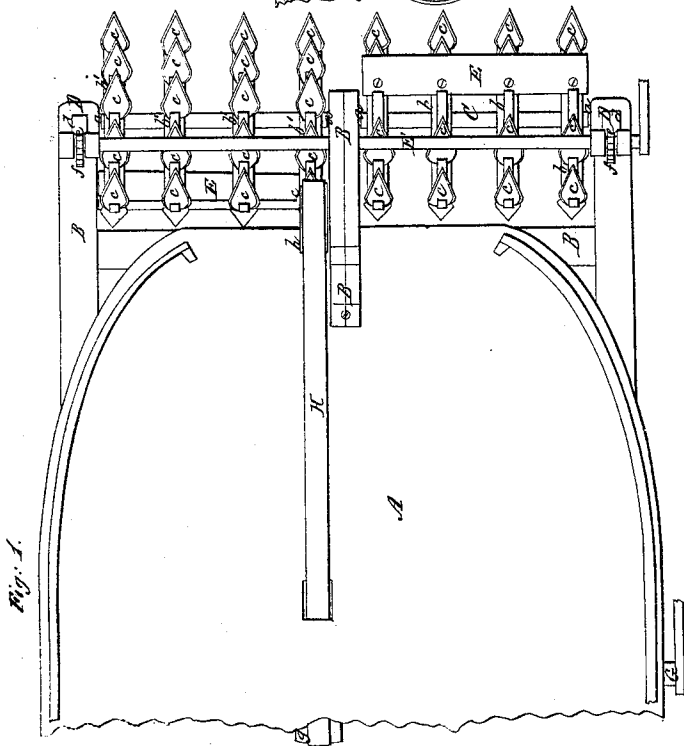
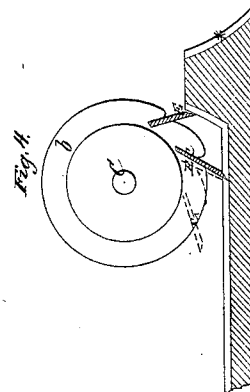


R. W. Heywood. Ice Boat & Breaker.

N^o 19,195.

Patented Jan. 26, 1858.



UNITED STATES PATENT OFFICE.

R. W. HEYWOOD, OF BALTIMORE, MARYLAND.

MACHINE FOR PLANING AWAY ICE IN RIVERS.

Specification of Letters Patent No. 19,195, dated January 26, 1858.

To all whom it may concern:

Be it known that I, R. W. HEYWOOD, of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Machines for Planing Away Ice in Rivers or Navigable Waters; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a plan or top view of my improvement applied to the bow of a boat. Fig. 2, is a vertical longitudinal section of the same. Fig. 3, is a side view of the same. Fig. 4, is a diagram illustrating the operation of my invention.

Similar letters of reference in each of the several figures indicate corresponding parts.

The main object of my invention is to provide a machine which will not only remove the ice out of the track of the boat but pulverize or reduce it to such a state that it will rapidly dissolve into water and thus not be capable of falling back into the path or track made by the boat, and of blocking or closing up the same before the boat makes its return trip.

The nature of my invention consists in the bevel edged plane-irons connected with the series of grooving beveled cutters *c, c*, for the purpose of grooving and planing away ice in navigable waters.

The nature of my invention consists, 2nd, in a peculiar arrangement and combination of the parts hereinafter specified, whereby the shaft carrying the grooving cutters and planing irons can be adjusted, without affecting the driving gear, so as not to come into operation at all or to suit different thicknesses of ice and thus inconvenience and loss of power from the plane irons entering the water below the bottom of the ice and lifting the same in passing up out of it, avoided.

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

A, represents the bow of a steam-boat. B, is a frame constructed upon or attached to the same. C, a transverse shaft hung upon adjustable standards D, D, D¹ of this frame. The shaft C, is square and yet is arranged to revolve freely, being furnished with round journals *a, a, a*. On the shaft of C, a series of circular disks *b, b, b¹, b¹*, are fastened firmly, and in the periphery of said

disks a series of sharp V shaped grooving cutters *c, c, c*, are set, tangentially, all within the same circle.

E, represents two plane irons set tangentially on the peripheries of the two sets of disks, *b, b, b¹, b¹* as shown. These plane irons occupy a position between two of the grooving cutters of each disk, and serve for uniting the several disks together. They are beveled on their inner edge, and gradually plane through the ice in the path of a vertical circle, their progress being eased by the grooving cutters forming grooves in the ice the same depth as that to which the plane irons are set to cut. It should be observed that the grooving cutters being set tangentially come into operation successively without one interfering with the other. It should also be observed that the plane irons have each a set of grooving cutters and that one plane iron precedes the other, this is done in order that all the planing shall not be done at the same time, and thus the full force of the power is brought to bear upon each plane when a space only half the width of the two planes, together, is being operated upon. These planes operate very similarly to the planes of a planing machine, they shaving away the ice as fine as snow by being revolved through it in the path of a vertical circle with a high speed, say two-hundred revolutions per minute. The cutting through the ice will be more perfectly effected by having the cutters very sharp and giving them a velocity so quick that they will not break the sheet into lumps. The cutters come in contact with the upper edge of the ice and pass down gradually in an inclined curved line as illustrated in Fig. 4 at *. It may be found advisable in some cases to set the cutters and planes so that they shall only cut or plane one-half or one-third through the ice, and the other portion being left unbroken yet so grooved and reduced that the boat will readily displace or make its way through it.

There may be a series of cutters for each set of disks if it should be found necessary in order to have the planing performed more rapidly and continuously.

The standards D, D, D', by which the shaft C, which carries the disks is supported is made adjustable so as to be thrown in and out of operation or so as to suit different thicknesses of ice by being arranged in and over guides *d, d'*, of the frame and by D, D,

having cog teeth *e, e*, in their back side, and said teeth meshing into pinions *f, f*, of an adjusting crank shaft *F*, as shown in Fig. 3. The motion is transmitted to the shaft of
 5 grooving and planing irons from the crank shaft *G*, of the engine by means of a band *H*, and endless chain *I*, said band passing around pulleys *g, h*, and the chain around a series of sprocket wheels *i, j*, the axis of one
 10 of those *i*, serving as the axis of the pulley *h*, and the axis of one of those *j*, being the shaft *C*. It will be seen that a portion of the wheels, those *j*, around which the chain passes, are adjustable with the shaft *C*,
 15 while the other, those *i*, are stationary with the frame; by this arrangement, the shaft can be adjusted without affecting the gearing, as the chain and the wheels *j*, move together.

20 From the foregoing it may be evident that this attachment will prove a useful auxiliary to boats navigating streams blocked up with ice, and that the great objection to the contrivances designed for breaking the ice

which have preceded it, will be avoided, as 25 the ice, instead of having a chance to fall back in the wake of the boat or collecting at the landings will be shaved up as fine as snow and dissolved by the water, and consequently a free and unobstructed passage se- 30 cured for a return and succeeding trips.

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

1. The bevel edged plane-irons *E*, connected with the series of grooving beveled 35 cutters *c, c*, for the purpose of grooving and planing away ice in navigable waters, substantially as set forth.

2. The peculiar arrangement consisting of the adjustable standards *D, D, D'*, pulleys 40 *i, j*, endless-chain *I*, pinions *f, f*, crank shaft *F*, in combination with the ice grooving and planing mechanism, substantially as and for the purposes set forth.

R. W. HEYWOOD.

Witnesses:

N. W. FENWICK,
 THOMAS D. STETSON.