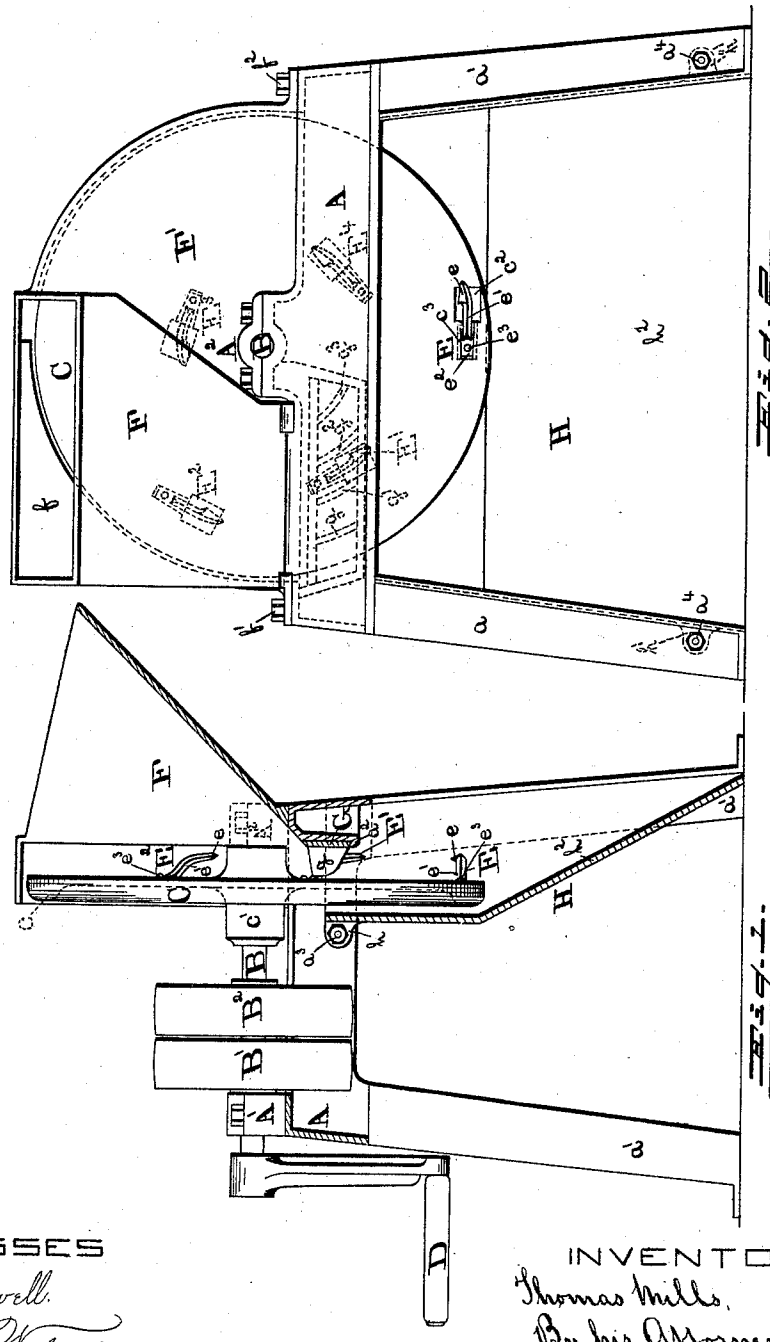
(No Model.)

2 Sheets—Sheet 1.

T. MILLS.

ICE BREAKING MACHINE.

No. 432,758. Patented July 22, 1890.



WITNESSES

K. A. Powell.

J. Milnor Walmsley.

INVENTOR

Thomas Mills.

By his Attorney

Wm. K. Powell.

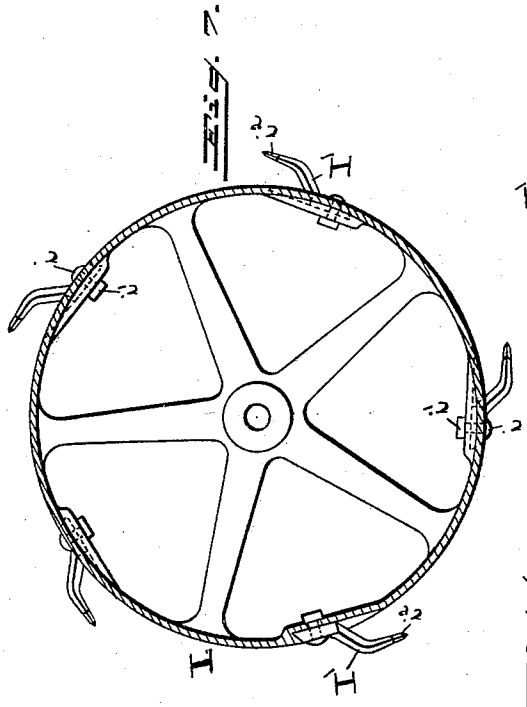
THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

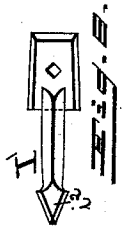
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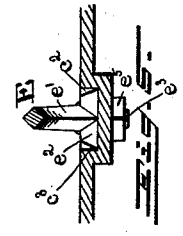
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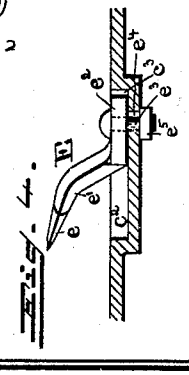
ICE BREAKING MACHINE.

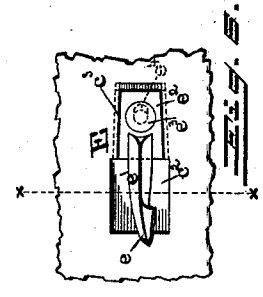
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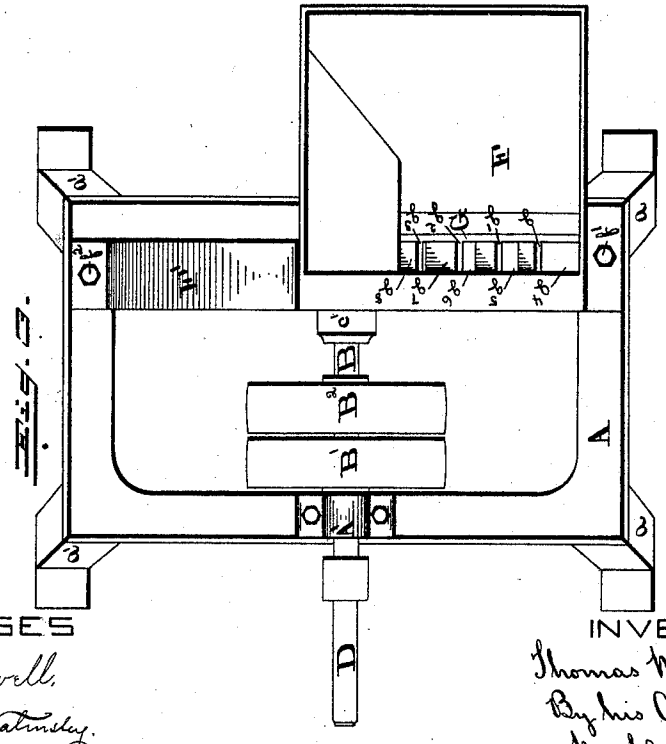


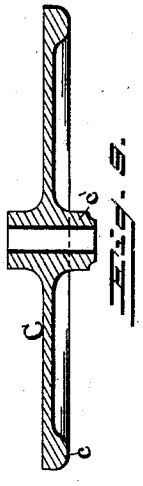












WITNESSES

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INVENTOR

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By his Attorney

Wm. H. Powell.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS MILLS, OF PHILADELPHIA, PENNSYLVANIA.

ICE-BREAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,758, dated July 22, 1890.

Application filed January 30, 1890. Serial No. 338,569. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MILLS, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ice-Breaking Machines, of which the following is a specification.

My invention has relation to the breaking of lumps of ice into small pieces for the various uses to which such broken ice is put; and it has for its object the provision of simple and efficient means for securing the picks or teeth to the rotary disk or cylinder of an ice-breaking machine which will operate to break or split the ice into pieces of approximately uniform size without chipping or shaving the same and causing a waste thereof.

My invention consists in the peculiar construction and combinations of parts hereinafter specified, having reference particularly to the formation of dovetail base-plates on the inner ends of the picks or teeth, which base-plates taper or diminish in width rearwardly; also to the provision of tapering dovetail slots or recesses in the surface of the disk or cylinder for the reception of said base-plates, thus obviating the necessity of providing means for securing the picks or teeth to the disk or cylinder other than the friction between the base-plates and the walls of the slots, the ends of said picks being a sufficient distance from the disk to allow of the same striking and penetrating the lumps of ice at such a distance from the edges of the latter as to obviate all tendency toward shaving or chipping.

Referring to the accompanying drawings, wherein Figure 1 is an end elevation, partly in section, Fig. 2 is a side elevation of the machine complete. Fig. 3 is a plan view of the machine as shown in Fig. 1. Figs. 4, 5, and 6 are a side elevation, an end elevation, partly in section, and a plan view, respectively, of the tooth and its method of fastening. Fig. 7 is a vertical transverse section of a cylinder with a modified form of picks secured thereon. Fig. 8 is a plan view of the latter, and Fig. 9 is a transverse section of the disk.

A represents the machine-frame, mounted on the legs $a\,a'$, and having the journal-boxes A′ A^2 thereon for the reception of the rotary shaft B, on which is secured the circular disk C, which is flat on one side and is depressed on the other side between its rim and center, leaving an enlarged portion c on said rim, serving the purpose of a fly-wheel.

B′ B^2 are a fast and loose pulley on the shaft B, between the box A′ and the central boss c' of the disk C, for the actuation of said shaft by steam-power, and D is a crank or handle on the end of the shaft outside of said box for the application of hand-power.

E E′ E^2 E^3 E^4 are the picks or teeth, having half spear-heads e and the main portions or bodies e', said heads being on the sides of said bodies nearest the center of the disk C, and curving inwardly with a radius equal to the distances at which they are placed from said disk-center.

e^2 are the base-plates of the picks, which, as shown in the drawings, are tapered or diminished in width rearwardly, and have their sides beveled or dovetailed outwardly from top to bottom.

c^2 are square depressions on countersinks in the flat side of the disk C, and c^3 are dovetailed groove-extensions of the depressions, said extensions being of the same shape as the base-plates e^2, but slightly larger and a little longer, such extra length being provided to allow a clearance between the rear ends of the plates e^2 and the ends of the grooves, so that when said plates are placed in the depressions c^2 and then slid into the dovetailed grooves, whose bottoms are flush with the bottoms of said depressions, the picks will be maintained in their proper positions by friction, and in case of their not being tightly secured the spaces at the ends of the grooves will allow of the picks being forced inwardly until the proper amount of frictional contact is obtained. It will thus be seen that the picks are securely maintained on the disk by providing simply the dovetail base-plates and the dovetail grooves, and any jarring or force exerted on the ends thereof when the disk or cylinder to which they are applied is rotated forwardly will serve to the more tightly fasten them in the grooves. At the same time it may be considered safe, for fear of the disk

or cylinder being turned backwardly and the rear of the spear-heads catching on the ice, the picks being thereby drawn from their slots, to provide the picks with openings in their base-plates for the passage of square-shanked bolts e^3, which pass through the elongated openings e^4 in the grooves c^3, and are secured in said openings by the nuts e^5, the elongated openings providing for the forcing of the base-plates into the grooves, as above mentioned.

F represents the hopper, having cast integral therewith the hollow arc-like lateral extension F′, the free end of which is bolted to the frame A in such position, as shown in the drawings, as to serve as a protecting-cover, having an interior of sufficient extent to allow of the free passage of said disk and its picks, while said cover protects said picks from injury and prevents injury happening to the operator from accidental contact with the picks.

f is a bracket secured in the corner of the hopper F and having one of its sides concaved correspondingly with the curvature of the rim of the disk C, which bracket prevents any ice from getting on the wrong side of said disk, the hopper and cover F′ being secured to the frame A by the bolts f' f^2.

G is a plate having its lower end resting in a flange or ledge formed on the frame A at a^2 and its upper edge in alignment with the lower part of the interior of the hopper F and its ends resting under the walls of said hopper, whereby it is secured in position, said plate having cast integral therewith the teeth g g' g^2 g^3, which, in vertical section, are of a curvature corresponding with that of the line of travel of the teeth or picks E E′, &c., said teeth having the intermediate or alternate spaces g^4 g^5 g^6 g^7 g^8, said teeth, spaces, and plate forming in effect a comb, and the spaces just mentioned, having their walls formed by the comb-teeth g g', which latter are of the same curvature as the line of travel of the picks, as above suggested, afford a free passage for said picks. Therefore when the ice is placed in the hopper it naturally slides to the bottom thereof and onto the upper edges of the comb-teeth, where it rests in the path of the teeth, so that when the disk is rotated the sharp spear-head ends of the picks, which flare outward and a considerable distance from the disks, will strike the ice a fair and splitting blow without merely chipping or shaving it, and the broken ice will fall through said comb-spaces. If any of the picks should strike a piece of ice in such a way as to cause the latter to slip away without being split, such piece will eventually be split by the inmost pick, because of its farther slipping being stopped by the wall of the hopper, and said picks are spirally arranged on the disk with such distances between adjacent picks as to prevent chopping of the ice into small pieces or chips, and thus avoids the consequent waste of material, while the uniformity of the spaces in the comb insures an approximate equality in the sizes of the pieces into which the ice is broken.

H represents a metallic apron or fender secured between the legs a a' by the bolts a^3 a^4 passing through the lugs h h' and into said legs, the upper end of this apron being bent into vertical alignment with and inside the inner edge of the disk C, so that as the broken ice falls through the comb it will strike the apron and be deflected onto the floor or into a suitable receptacle by the inclined portion h^2 of said apron.

I represents the usual form of cylinder with a modified form of picks I′ thereon, which are secured in dovetail slots in the periphery of the cylinder by the bolts i and nuts i', after the manner of securing the picks on the disk, the only difference being in making said picks straight and their heads i^2 double or a full spear-head, the comb for such picks of course having straight teeth. With the provision of the particular form of pick-heads shown in the main portion and in the modification of my invention, the same being very sharp on their edges and thin in vertical section, every time a pick comes into violent contact with a lump of ice said heads will penetrate the ice and split the same, at the same time resisting fracture of themselves.

I am aware that the main features of the machine hereinbefore described (with the exception of the method of securing the picks or teeth to the disk or cylinder) are, broadly, old. Therefore I do not wish to be understood as claiming such features as my invention. At the same time I do not wish to confine my invention to the particular shape of the shank which is mounted on the dovetail base-plate, nor to the particular form of head for the picks.

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

1. The combination of a pick or tooth carrier of an ice-breaking machine provided with one or more dovetailed rearwardly-diminishing grooves or sockets, a dovetailed rearwardly-diminishing base-plate in each groove or socket and supporting a pick or tooth, and a bolt or other retainer passing through each base-plate and the bottom of its groove or socket, substantially as and for the purpose specified.

2. The combination of a pick or tooth carrier of an ice-breaking machine provided with one or more surface-depressions and a dovetailed rearwardly-diminishing groove or socket opening into each depression, a dovetailed rearwardly-diminishing base-plate in each groove or socket and supporting a pick or tooth, and a bolt or other retainer passing through each base-plate and the bottom of its groove or socket, substantially as and for the purpose specified.

3. The combination of a pick or tooth carrier of an ice-breaking machine provided with one or more rearwardly-diminishing

grooves or sockets, a rearwardly-diminishing base-plate in each groove or socket and supporting a pick or tooth, and a bolt or other retainer passing through each base-plate and a longitudinal slot in the bottom of its groove or socket, substantially as and for the purpose specified.

4. The combination of a pick or tooth carrier of an ice-breaking machine provided with one or more surface-depressions and a dovetailed rearwardly-diminishing groove or socket having therein a longitudinal slot opening into each depression, a dovetailed rearwardly-diminishing base-plate in each groove or socket and supporting a pick or tooth, and a bolt or other retainer passing through each base-plate and said slot, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of January, A. D. 1890.

THOMAS MILLS.

Witnesses:
WM. H. POWELL,
R. DALE SPARHAWK.

Corrections in Letters Patent No. 432,758.

It is hereby certified that in Letters Patent No. 432,758, granted July 22, 1890, upon the application of Thomas Mills, of Philadelphia, Pennsylvania, for an improvement in "Ice-Breaking Machines," errors appear in the printed specification requiring the following corrections, viz: In line 12, page 3, a comma should be inserted after the word "socket" and after the word "slot"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 29th day of July, A. D. 1890.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.