No. 850,093. PATENTED APR. 9, 1907.

G. M. MILLS.

ROTARY ICE BREAKING MACHINE.

APPLICATION FILED DEC. 11, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

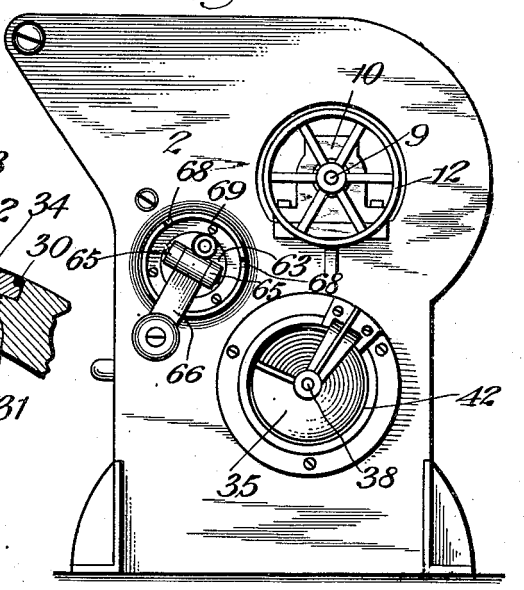
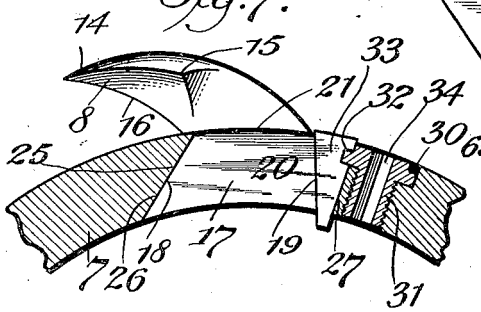


Fig. 7.



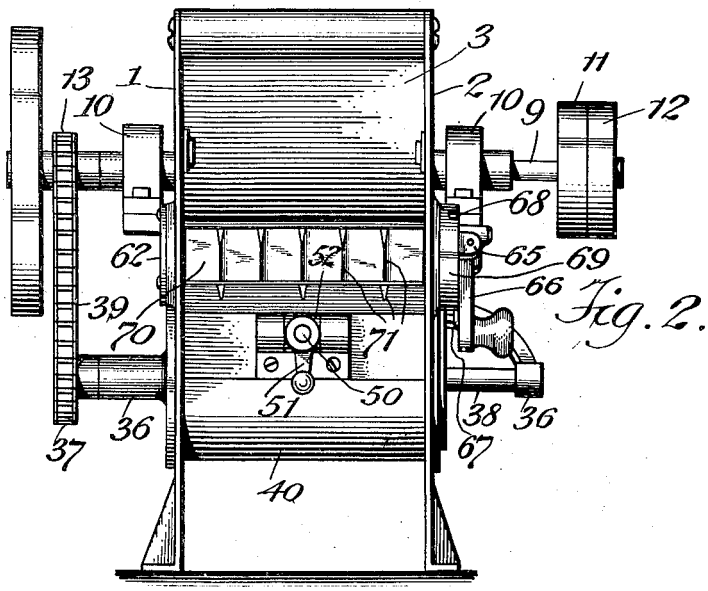


Fig. 2.

Witnesses
A. R. Stephenson
C. L. Wolf.

Inventor
George M. Mills
By his Attorney
Charles A. Stephens

No. 850,093. PATENTED APR. 9, 1907.

G. M. MILLS.

ROTARY ICE BREAKING MACHINE.

APPLICATION FILED DEC. 11, 1905.

2 SHEETS—SHEET 2.

Fig. 8.

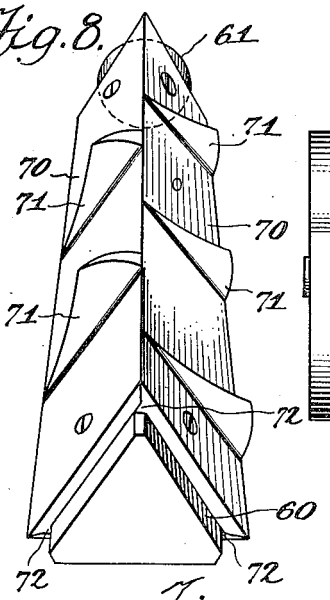


Fig. 3.

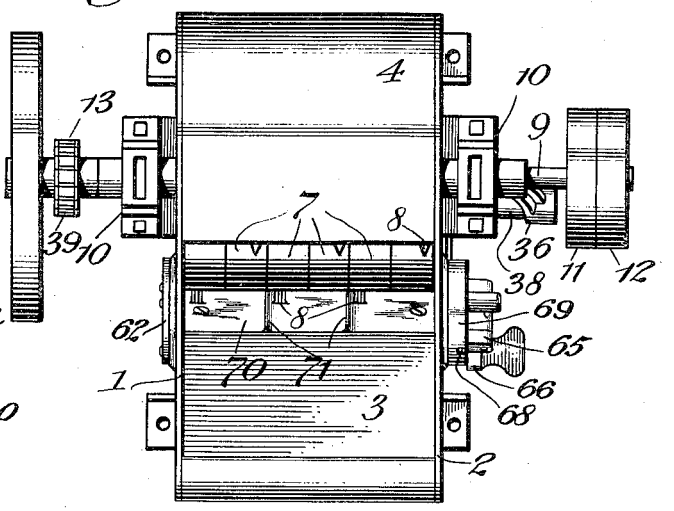


Fig. 4.

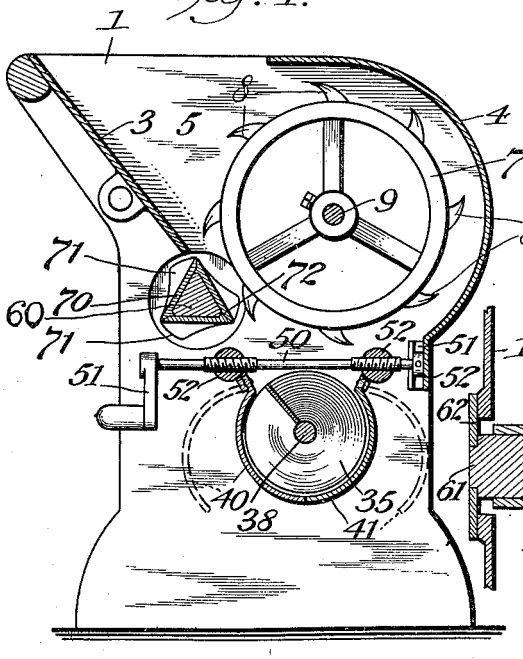
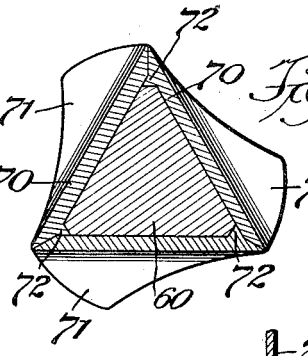


Fig. 6.



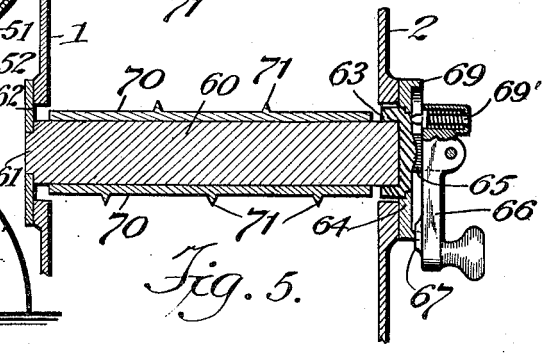


Fig. 5.

Witnesses

A. R. Appleman

C. L. Wolf.

Inventor

George M. Mills

By his Attorney

Charles A. Stephens

UNITED STATES PATENT OFFICE.

GEORGE M. MILLS, OF JERSEY CITY, NEW JERSEY.

ROTARY ICE-BREAKING MACHINE.

No. 850,093. Specification of Letters Patent. Patented April 9, 1907.

Application filed December 11, 1905. Serial No. 291,216.

To all whom it may concern:

Be it known that I, GEORGE M. MILLS, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Rotary Ice-Breaking Machines, of which the following is a specification.

My invention relates to improvements in ice-breaking machines.

It has for its object, first, to provide means whereby the ice may be broken without producing snow-ice; second, to provide means whereby the size of the pieces into which the ice is to be broken may be regulated; third, to provide means whereby the direction of the discharge of the pieces of ice may be regulated, and, fourth, to provide a device of the character set forth embodying advantages in point of perfect operation, simplicity, and inexpensiveness of construction, strength, and durability.

In the drawings, Figure 1 is a side view of the machine; Fig. 2, a front view; Fig. 3, a plan view; Fig. 4, a longitudinal vertical sectional view; Fig. 5, a fragmentary detail sectional view, on an enlarged scale, showing the means for regulating the size of the pieces into which the ice is to be broken. Fig. 6 is a detail sectional view, on an enlarged scale, of the triangular bar and plates thereon. Fig. 7 is a fragmentary detail side view, on an enlarged scale, showing one of the ice-breaking teeth and the means for removably securing it to one of the rings forming the cylinder. Fig. 8 is a perspective view of the triangular bar and plates thereon.

In all the figures of the drawings illustrating my invention like reference characters designate corresponding parts.

Referring to the drawings, the casing of the machine comprises side plates 1 and 2, having their upper ends connected together at the front by a rearwardly-slanting plate 3 and at the rear by a curved plate 4, thereby forming a compartment 5, having an upper or receiving opening and a lower or discharging opening.

Within the compartment 5 is located an ice-breaking cylinder comprising rings 7, each having immovable ice-breaking teeth 8 and being independently secured upon the power-shaft 9, which is journaled in bearings 10 on the side plates and provided on one end with a loose pulley 11 and a fast pulley 12 and on the other end with a sprocket-wheel 13. Each tooth embodies a head having a forwardly-projecting pointed portion 14, provided with lateral cutting edges 15, an undercutting edge 16, and a depending tongue 17, having inwardly-slanting front and rear edges 18 and 19, respectively, and parallel side faces 20, said tongue being of less width than the head, so as to form lateral shoulders 21, adapted to rest on the cylinder. Oblong slots 25 are provided in the cylinder to receive and hold said teeth, said slots being made of greater length than the tongues and having substantially parallel rearwardly-slanting front and rear walls 26 and 27, respectively, and parallel side walls. The slots 25 extend at the rear into circular recesses 30, each having a screw-threaded hole extending through its bottom wall and adapted to receive the screw-threaded shank of a binding-screw 31, the head of said binding-screw being adapted to seat in the notch 30 and engage and turn in a notch 32 in the rear face of a wedge-shaped block 33, and thereby provide means for positively raising and lowering said block, the front slanting face of which is adapted to bear against the rear edge of the tongue 17 and hold the tooth in place. From this construction it will be obvious that when the binding-screw is turned outwardly by means of a spanner inserted in the square hole 34 therein the wedge-shaped block will be drawn outwardly to disengage and release the tooth and that when the binding-screw is turned inwardly by means of the spanner the wedge-shaped block will be forced inwardly to engage and clamp the tooth in position.

Beneath the discharge-opening of the compartment 5 is located the spiral ice-conveyer 35, which is journaled in bearings 36 on the side plates and rotated by means of a sprocket-wheel 37 on the shaft 38 thereof, connected with the sprocket-wheel 13 on the drive-shaft 9 by a sprocket-chain 39.

A chute is provided for directing the discharge of the ice from the machine, said chute embodying curved sections or plates 40 and 41, pivoted on the side plates of the casing at each side of the spiral conveyer and adapted to be turned in one direction on their pivots, so as to close beneath the conveyer and direct the discharge of the ice through a hole 42 in the side plate 2 or turned in the opposite direction on their pivots to open and allow the discharge directly downwardly.

The means for opening and closing the chute embodies a rod 50, having a handle 51 on one end for turning it, a circular enlargement 52 on the other end adapted to work in a guide 51 on the plate 4, and right and left handed screw-threaded portions engaging screw-threaded holes in bearing-blocks 52, pivotally supported in recess in the upper edges of the curved sections of the chute, from which construction it will be understood that when the rod 50 is turned in one direction the curved sections will be turned on their pivots so as to open and when turned in the reverse direction the curved sections will be turned on their pivots so as to close.

A triangular bar 60, having flattened corners, is rotatably mounted between the plate 3 and the curved section 40, one end of said bar being provided with a journal 61, mounted in a bearing-plate 62, secured to the plate 1, and the other end of said bar being received by an angular sleeve on the inner face of a disk 63, rotatably mounted in a bearing 64, formed on the side plate 2.

The outer face of the disk 63 is provided with ears 65, between which is pivotally mounted a handle 66, having a lug 67 formed on its inner face near one end and adapted to be engaged with and disengaged from notches 68 in a flange 69 on the side plate 2 to adjust and fix the triangular bar in the desired position and in its other end with a spring-pressed pin 69′, engaging the disk 63.

Plates 70 are secured by screws to the wide faces of the triangular bar 60 and provided with varying numbers of ice-breaking teeth 71 and flanges 72, adapted to engage the flattened corners of the triangular bar and relieve the strain on the screws, from which construction it will be understood that when the bar 60 is turned and locked so that the plate having the greatest number of ice-breaking teeth is brought flush with the lower end of the plate 3 and facing the cylinder the ice passing from the chamber down between the ribs and the teeth on the cylinder will be cut into small pieces, that when the plate having the least number of teeth is brought into position and the bar locked the ice passing from the chamber down between the teeth will be cut into large pieces, and that when the other plate is brought into position and the bar locked the ice passing from the chamber down between the teeth will be cut into medium-sized pieces.

The operation of the machine is as follows: The handle 66 is turned to bring the plate having the required number of teeth flush with the plate 3, and if it is desired to discharge the ice to the side the handle 51 is turned to close the curved sections of the chute, whereupon if ice be introduced into the chamber 5 and the machine be started the teeth 8 of the cylinder will draw the ice down against the teeth on the triangular bar 60 and coact therewith in breaking it up, after which it will be discharged through the hole 42 by the spiral conveyer.

I do not wish to be understood as limiting myself to the precise details and arrangements of parts shown and described, but reserve the right to all modifications within the scope of my invention.

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

1. In an ice-breaking machine, the combination of the casing having a side discharging-opening and a bottom discharging-opening, a discharging-conveyer and a chute for directing the discharge through the side or the bottom discharging-opening embodying pivoted sections adapted to be opened and closed below said conveyer, substantially as described.

2. In an ice-breaking machine, the combination of the casing having a side discharging-opening and a bottom discharging-opening, a discharging-conveyer and a chute for directing the discharge through the side or the bottom discharging-opening embodying pivoted sections adapted to be opened and closed below said conveyer, and means for opening and closing said sections, substantially as described.

3. In an ice-breaking machine, the combination of the casing having a side discharging-opening and a bottom discharging-opening, a discharging-conveyer and a chute for directing the discharge through the side or the bottom discharging-opening embodying pivoted sections adapted to be opened and closed below said conveyer, and an oppositely-screw-threaded rotatable rod for opening and closing said sections, substantially as described.

4. In an ice-breaking machine, a cylinder having slots and screw-threaded holes, ice-breaking teeth provided with tongues projecting into said slots, wedges having undercut notches and projecting into said slots and engaging said tongues and set-screws projecting into said screw-threaded holes and their heads engaging the undercut notches in said wedges, substantially as described.

5. In an ice-breaking machine, a cylinder having slots and screw-threaded holes, ice-breaking teeth provided with tongues projecting into said slots, wedges having undercut notches and projecting into said slots and engaging said tongues and set-screws provided with spanner-holes and projecting into said screw-threaded holes and their heads engaging the undercut notches in said wedges, substantially as described.

6. In an ice-breaking machine, a cylinder having slots and screw-threaded holes, ice-breaking teeth provided with forwardly-projecting points having cutting edges and tongues projecting into said slots, wedges

having undercut notches and projecting into said slots and engaging said tongues and set-screws projecting into said screw-threaded holes and their heads engaging the undercut notches in said wedges, substantially as described.

7. In an ice-breaking machine, the combination of the casing, a cylinder having ice-breaking teeth, means coöperating therewith for regulating the size of the pieces into which the ice is to be broken embodying a rotatable bar provided with varying numbers of ice-breaking teeth and means for adjusting and fixing said bar embodying a handle pivoted thereon and means on said casing adapted to be engaged by said handle, substantially as described.

8. In an ice-breaking machine the combination of the casing, a cylinder having ice-breaking teeth, means coöperating therewith regulating the size of the pieces into which the ice is to be cut embodying a rotatable bar provided with varying numbers of ice-breaking teeth and means for adjusting and fixing said bar embodying a disk secured to said bar, a spring-pressed handle pivoted thereon and a flange on said casing provided with notches adapted to be engaged by said handle, substantially as described.

9. In an ice-breaking machine the combination of the casing, a cylinder having ice-breaking teeth, means coöperating therewith for regulating the size of the pieces into which the ice is to be cut, embodying a rotatable bar provided with varying numbers of ice-breaking teeth and means for adjusting and fixing said bar embodying a spring-pressed handle pivoted thereon and means on said casing adapted to be engaged by said handle, substantially as described.

10. In an ice-breaking machine the combination of a cylinder having slots and screw-threaded holes, ice-breaking teeth having tongues projecting into said slots, wedges having undercut notches and projecting into said slots and engaging said tongues, set-screws projecting into said holes, and their heads engaging the undercut notches in said wedges and means coöperating with said teeth for regulating the size of the pieces into which the ice is to be cut embodying a rotatable bar having ice-breaking teeth, substantially as described.

11. In an ice-breaking machine the combination of a cylinder having ice-breaking teeth and means coöperating therewith embodying a rotatable angular bar provided with flattened corners and plates secured thereon and having varying numbers of ice-breaking teeth and flanges engaging said flattened corners, substantially as described.

Signed at New York, in the county of New York and State of New York, this 1st day of December, A. D. 1905.

GEORGE M. MILLS.

Witnesses:

CHAS. L. WOLF,

A. B. BLACKWOOD.