Sept. 29, 1942. W. W. BATEMAN ET AL 2,297,604

ICE BREAKING AND SIZING MACHINE

Filed Sept. 18, 1941

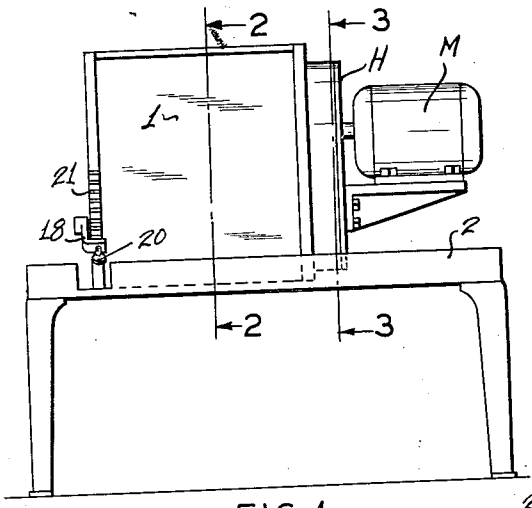

FIG. 1.

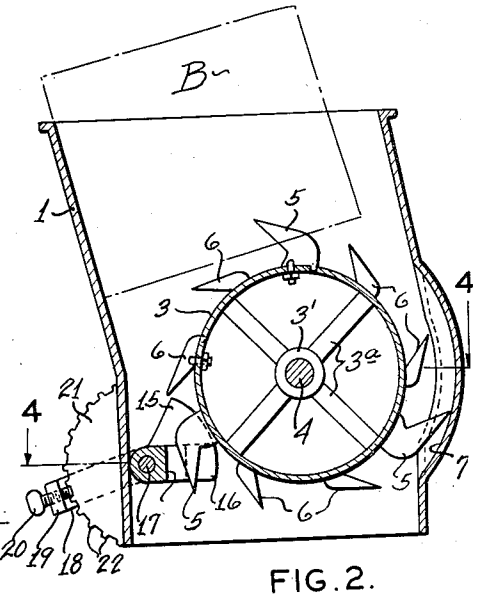

FIG. 2.

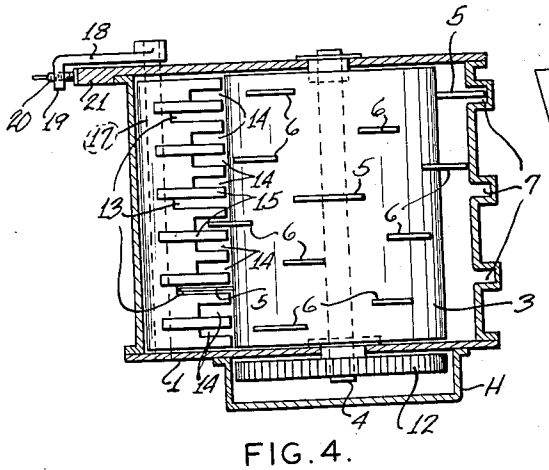

FIG. 4.

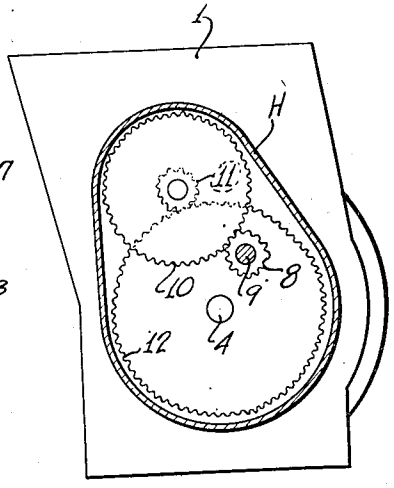

FIG. 3.

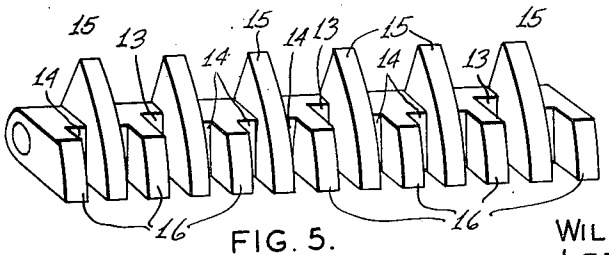

FIG. 5.

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ICE BREAKING AND SIZING MACHINE

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Application September 18, 1941, Serial No. 411,332

1 Claim. (Cl. 83—63)

This invention relates to ice breaking and sizing machines, and has for its principal object to provide means for reducing blocks of ice to smaller chunks, and then still further reducing such chunks to graded sizes, so as to yield whatever quantity is desired of ice in pieces of a particular size and thus provide ice in sizes suitable for various purposes. An advantage of our machine is that the grading means thereof can be easily and quickly adjusted so as to permit pieces of a predetermined size only to emerge from the machine, which adjustment is made by merely raising or lowering a lever and locking the same into position by the turn of a screw. Another advantage of our invention is the association with it of reduction gear in such a manner as to reduce the speed of the pick drum from the usual approximately 300 R. P. M. to about 110 or 115 R. P. M., since the lower the speed of the drum, the more effective it is in breaking off chunks from the block of ice and reducing them without shattering the ice and forming snow ice, or pulverized ice.

Fig. 1 is a front, elevational view of our machine.

Fig. 2 is a vertical cross-section taken on line 2—2, Fig. 1, illustrating particularly the pick-drum and rocking grate.

Fig. 3 is a vertical cross-section taken on line 3—3, Fig. 1, illustrating the reduction gear.

Fig. 4 is a horizontal section taken on line 4—4, Fig. 2, illustrating the association of the pick-drum with the rocking grate.

Fig. 5 is an enlarged perspective of the adjustable rocking grate.

The invention comprises a bottomless, inclined chute 1 which rests upon a supporting framework 2. A cylindrical drum 3, provided with a hollow core 3' and spokes 3a radiating therefrom, is mounted on a rotatable shaft 4 supported by the side walls of the chute 1. On its periphery the drum 3 is provided with a plurality of relatively large ice picks 5 and a much greater number of smaller ice picks 6. It is to be understood that the number of both the large and small ice picks may vary, but we have found that the best results are obtained with three of the large picks and twenty-one of the small picks. The picks are sharp-pointed and may be secured to the drum in any preferred manner. All of the picks 5 and 6 are arranged in diagonal and staggered relationship on the periphery of the drum, and wherever a large pick 5 occurs it occupies a position in the orderly arrangement which would ordinarily be taken by a pick if all the picks were of one size. The rear wall of the chute 1 has outwardly curved, grooved sections 7 positioned in the path of the large picks to accommodate these picks when the drum 3 is being rotated (Figs. 2 and 3).

The drum 3 is driven by a motor M (though other driving means may be used if desired), preferably located to the right of the chute, and in order to reduce the speed of rotation of said drum, reduction gear is provided between the motor and the chute for engagement therewith. The reduction gear includes a gear wheel 8, mounted on the motor drive shaft 9 and meshing with an idler gear 10, and a second idler gear wheel 11 rotatable with the gear 10 and meshing with a gear wheel 12 mounted on the drum shaft 4, the entire train of gearing being enclosed within a housing H (see Fig. 3).

Within the lower portion of the chute 1 and between the front wall of said chute and the pick drum 3 we place a rocking grate, having deep slots 13 and shallow slots 14 so positioned that when the drum 3 is rotated the large picks 5 will register with the slots 13 and the small picks 6 with the slots 14, members 15 and 16 being provided to separate the slots from each other. The entire rocking grate is rigidly secured to a shaft 17 pivotally mounted in the side walls of the chute 1 (Figs. 4 and 5).

The rotatable shaft 17 projects outwardly a short distance through an aperture in the left-hand side wall of the chute 1, and a forwardly extending adjusting handle 18 is rigidly secured to the outwardly projecting portion of said shaft 17. Thus it will be seen that manipulation of the handle 18 swings the rocking grate in an arc of a circle to increase or diminish the distance between the grate and the pick drum. The handle 18 has at its forward end a member 19 angularly disposed thereto, and said end member 19 has a threaded aperture through which a locking screw 20 is passed. The left-hand wall of the chute 1 has a forwardly curved extension 21 positioned directly behind and slightly spaced apart from the end member 19 of the adjusting handle 18, the purpose of which will be later explained.

When the invention is put into service, the rocking grate is adjusted according to the size of the pieces into which it is desired to break up the ice. This is done by manipulating the adjusting handle 18, as previously explained, and since the distance between the pick drum and the members 15 and 16 of the grate is greatest when the rocking grate is turned to its lowermost position, it will be understood that the smaller

the pieces of ice desired the higher the rocking grate must be positioned to allow only pieces of the desired size to fall through into a receptacle below (not shown). When the grate has been turned to the required position, the locking screw 20 is turned until it comes into firm gripping engagement with the periphery of the curved section 21 of the side wall of the chute 1 and thus keeps the handle 18 from further movement, and to guard against accidental slippage of said handle the periphery of said curved section 21 is knurled, as shown at 22 in Fig. 2.

When the grate has been adjusted as described, the motor M is started and a block of ice B is lowered into the chute 1 (Fig. 2). The angle of inclination of said chute is such as to prevent the ice from sliding too rapidly and consequently being projected with too great force onto the pick drum 3. As the motor driven pick drum rotates, the large picks 5 act to break off chunks from the block B, and as these chunks fall upon the grate structure they are further operated upon by the large ice picks 5 and also by the smaller ice picks 6. This action is continuous, and when the broken off pieces have been sufficiently reduced in size by the picks they will fall through the space between the drum 3 and the grate structure. It will be readily seen from the above description that all of the pieces of ice falling into the receptacle below will be of approximately the same size. As the pick drum rotates, the large picks pass through the registering slots 13 and the small picks 6 through the slots 14 of the grate structure, and the large picks also pass through the grooved sections 7 in the rear wall of the chute 1.

By virtue of the train of reduction gearing in the housing H the speed of the pick drum is reduced, and this, as mentioned before, prevents shattering of the ice as it is being broken from the ice block and while it is being sized by the picks 5 and 6.

The use of three large picks 5 and twenty-one smaller picks 6 has been found most satisfactory, as this allows the breaking off of chunks from the block B at a rate which permits sufficient time for the pieces to be sized and fall through into the receptacle below without clogging the machine, but, as said before, any number of picks may be used that is preferred.

We claim:

An ice breaking and sizing machine comprising an ice-receiving chamber, a rotatable drum having on its periphery a small number of large picks and a much greater number of small picks for breaking chunks from said ice and for reducing said chunks to smaller pieces, said picks being arranged on said drum in diagonal, staggered relation, a rocking grate pivotally supported between the side walls of said ice-receiving chamber and adapted to be swung in an arc of a circle for adjustment with relation to said rotatable drum for permitting said smaller pieces to emerge from said machine only when said pieces have been reduced to a predetermined size, said rocking grate having slots of various sizes through which the various sized picks pass when the drum is being rotated and the rear wall of said ice-receiving chamber being provided with grooves through which the large picks pass, a handle secured to the shaft of said rocking grate adjacent a side wall of said ice-receiving chamber and having an angular, apertured end member through which a locking screw is passed, said side wall having a forwardly extended section with a knurled periphery adapted to contact said locking screw in gripping engagement to hold said rocking grate in its adjusted position, and reduction gearing associated with a source of power and with said rotatable drum for reducing the speed of rotation of said drum.

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