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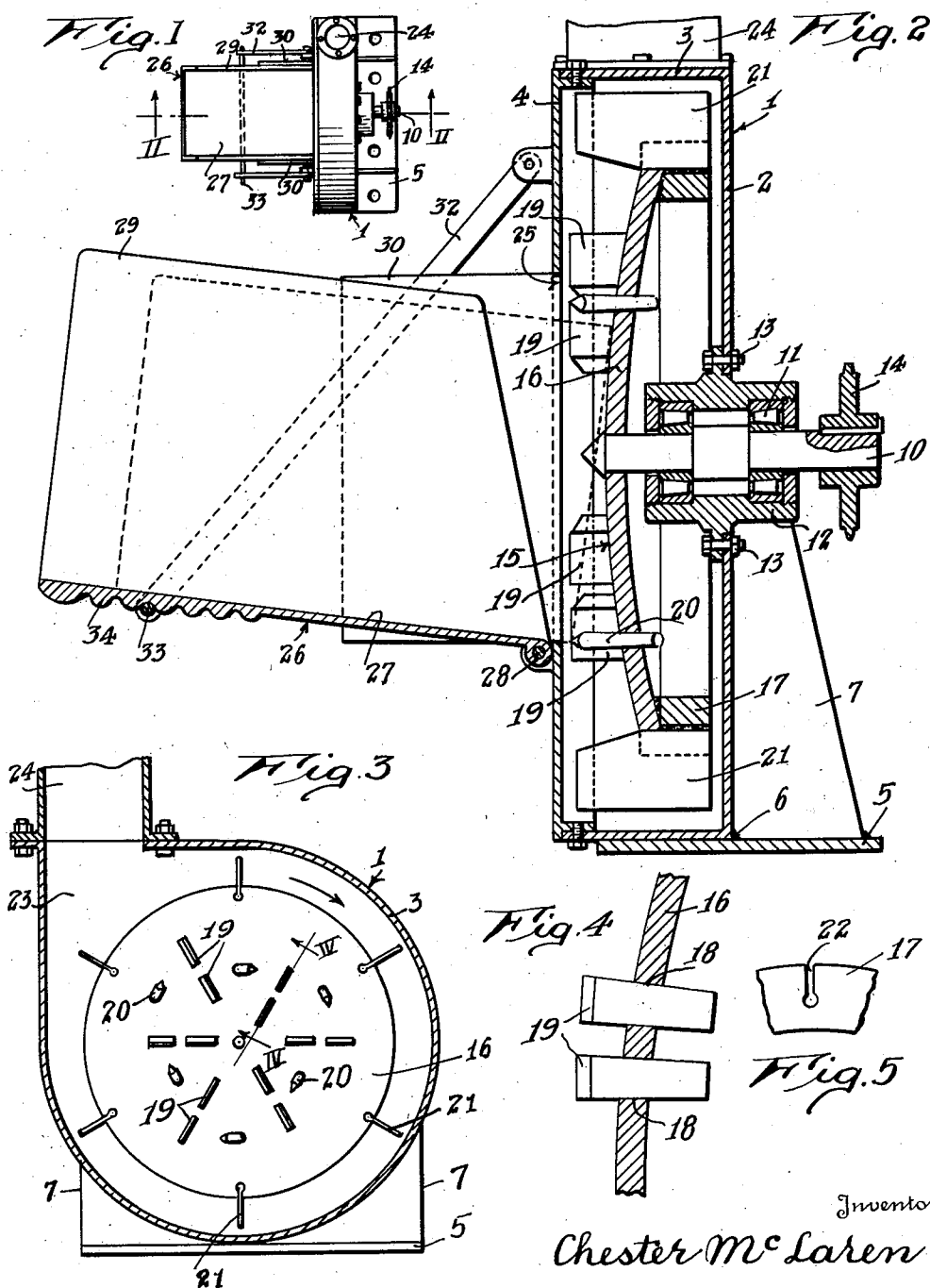
C. McLAREN

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ICE SHAVER AND BLOWER

Filed June 10, 1941

2 Sheets-Sheet 1



Inventor

Chester McLaren

By

Lyon & Lyon

Attorneys

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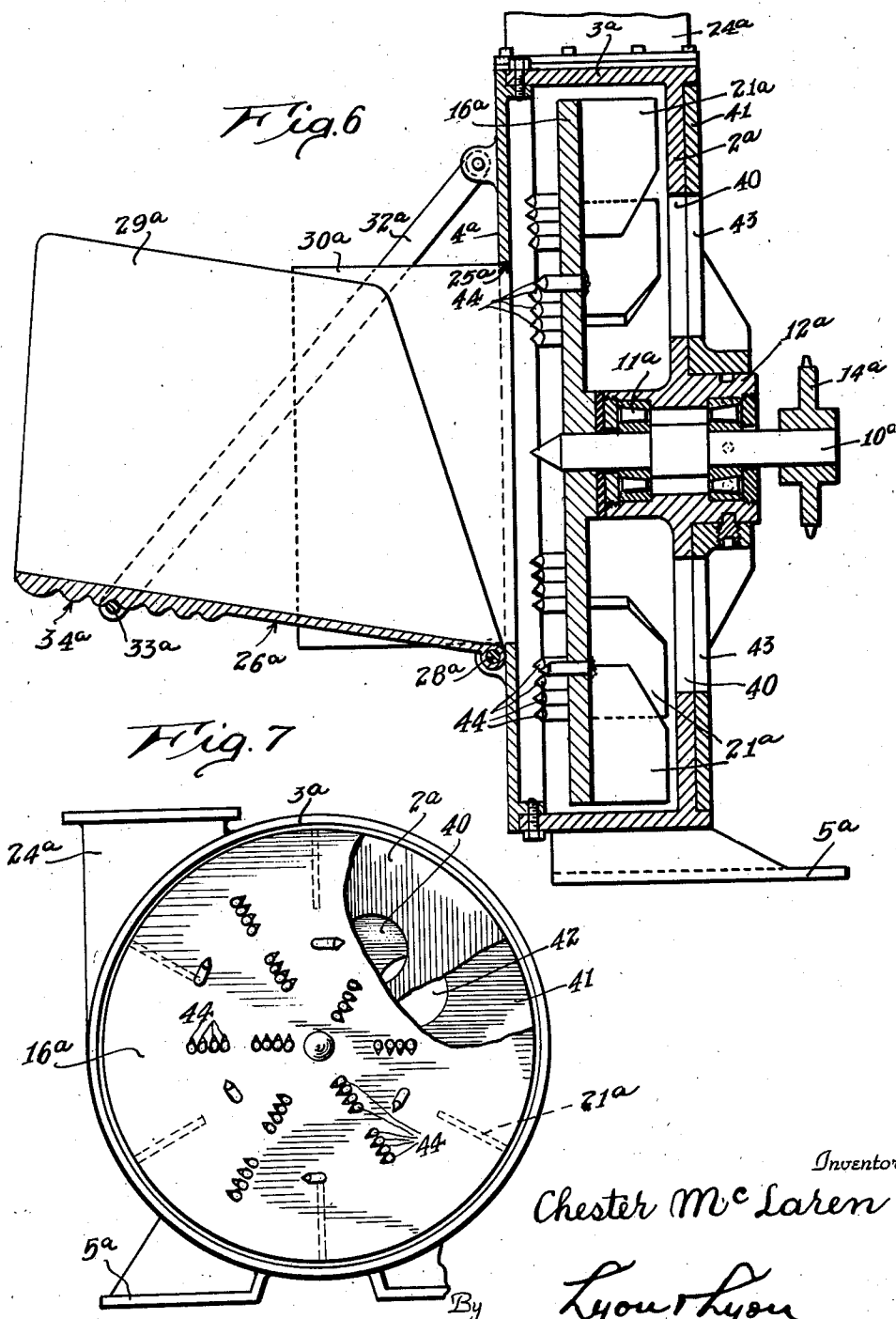
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Inventor

Chester McLaren

Lyon & Lyon

Attorneys

UNITED STATES PATENT OFFICE

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ICE SHAVER AND BLOWER

Chester McLaren, Yuma, Ariz.

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1 Claim. (Cl. 83—63)

This invention relates to devices for converting cakes of ice into finely divided ice particles and delivering them to a desired point.

Ice shavers themselves are very old, usually consisting of a rotating drum or disc having knives secured thereto, against which a cake of ice is pressed, the knives cutting off thin shavings of the ice which drop down clear of the cutting knives, and are usually fed by gravity either to a bin or to a blower which entrains the finely divided ice in a current of air to thereby convey the ice to a distant point.

A general object of the present invention is to provide a simplified machine for performing the two operations of producing shaved ice from an ice cake and discharging the shaved ice in a current of air for transfer to a desired distant point.

A more specific object is to provide a combined ice shaver and blower having a single rotary element functioning both to carry the ice shaving knives and blower vanes for producing the current of air in which the shaved ice is entrained for delivery.

Other more specific objects and features of the invention will become apparent from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which

Fig. 1 is a plan view of an ice shaver and blower in accordance with the invention;

Fig. 2 is a vertical sectional view, taken in the plane II—II of Fig. 1;

Fig. 3 is an end view with the front casing wall removed, showing the face of the rotor;

Fig. 4 is a detail sectional view, taken substantially in the plane IV—IV of Fig. 3;

Fig. 5 is a detailed view illustrating the manner of attachment of the blower vanes to the rotor;

Fig. 6 is a view similar to Fig. 2, but showing an alternative construction of the blower; and

Fig. 7 is a face view of the rotor in the machine of Fig. 6.

The machine shown in Figs. 1 to 5 in the drawings comprises a main casing 1 consisting of a flat rear wall 2 and a peripheral wall 3 having a removable front cover plate 4. The main casing 1 is supported on a base 5 to which it is welded, as indicated at 6. Reinforcing flanges 7 extend upwardly from the base 5 and are secured to the rear wall member 2, as by welding at suitable points.

A rotor is mounted within the casing and is supported on a shaft 10 which is rotatably mounted by antifriction bearings 11 in a bearing cage 12 mounted on the rear wall 2. Thus the wall 2

is provided with a central opening in which the cage 12 is positioned, being secured in place by bolts 13. On its outer end the shaft 10 has keyed thereto a sprocket 14 adapted to be rotated by a chain from any suitable source of power and on its inner end the shaft 10 has rigidly secured thereto, as by welding, a shoulder generally designated 15. This shoulder 15 consists of a dished disc 16, welded at its center to the shaft 10 and welded adjacent its peripheral edge to a rim 17 having substantial inertia and thereby a substantial flywheel effect.

The disc 16 has angled apertures 18 extending therethrough for receiving cutting tools, which function to shave the ice. These cutting tools may include chisels 19 and picks 20, all extending at a suitable angle relative to the direction of rotation of the rotor 15 to shave and chip the face of a cake of ice pressed against the disc. The apertures 18 and the shank of the chisels 19 and picks 20 inserted therein may be wedge shape so that they may be inserted or removed from the front side of the disc 16 but tend to be wedged in place during normal operation.

Also attached to the rotor 15 are a plurality of blower vanes 21 which are mounted in radial grooves 22 (Fig. 5) in the rim portion 17 of the rotor, and are welded in place. Any desired number of these vanes 21 may be employed, the particular machine illustrated carrying six vanes disposed symmetrically about the rim of the rotor. The outer edges of these vanes 21 approach quite closely to the peripheral wall 3 of the casing, which is bowed outwardly at one peripheral point (Fig. 3) to form a tangentially disposed discharge passage 23 leading to a discharge conduit 24. The conduit 24 may extend to any desired point.

In order to feed a cake of ice against the face of the rotor 15, the front wall 4 of the casing is provided with a window 25 of suitable dimensions to pass a cake of ice, which cake of ice may be supported in a chute 26 having a bottom wall 27 hingedly secured at one end by a hinge rod 28 to the front wall 4 immediately below the window 25. The chute 26 has, in addition to the bottom wall 27, side walls 29 which fit within a pair of short side walls 30 secured to and extending forwardly from the cover 4 on each side of the window 25. The chute 26 is adapted to be supported near its outer end by a pair of arms 32 hingedly supported at their upper ends to cover member 4 and extending forwardly and downwardly, the lower ends of the arms being interconnected by a rod 33 extend-

ing under the floor member 27 of the chute and selectively engageable with different teeth of a rack 34 secured to the underside of the floor member 27. By positioning the rod 33 at different points along the rack 34, the angle of the chute may be varied as desired to provide the proper inclination to slide the ice cake against the cutters.

In operation, the rotor is set in rapid rotation by applying power to the shaft 10 through the sprocket wheel 14, and a cake of ice is placed on the chute 27, which is so inclined as to cause the ice cake to slide into the rotating rotor. The chisels 19 and the picks 20 gradually shave and break the cake of ice into finely divided particles which are immediately entrained in the blast of air created by the vanes 21 on the rotor and are discharged into the conduit 24, which may be of substantial length for conveying the ice to a desired point and discharging it.

A variation of the construction described is shown in Figs. 6 and 7, in which parts corresponding to the other figures bear the same reference numeral with the suffix *a*.

The device of Fig. 6 differs essentially from that in Fig. 2 in that the blower vanes 21*a* instead of being exterior and extending radially beyond the periphery of the rotor disc 16*a*, are positioned on the rear face of the disc and do not extend radially beyond the periphery of the disc. An advantage of this construction is that the blower case can be of smaller dimension. Thus the size of the cutting area of the disc is determined by the size of the ice cake that is to be handled, and in accordance with the construction of Fig. 6 the cutting disc does not have to be any larger, and the casing does not have to be any larger, radially, than in a conventional cutting machine that does not blow the ice.

When the vanes 21*a* are positioned on the rear side of the disc 16*a*, as shown in Fig. 6, it is desirable to provide for the admission of air to the rear side of the disc. I accomplish this in the construction of Fig. 6 by providing a plurality of apertures 40 in the rear wall 2*a* of the case. To permit adjustment of the size of the holes, I provide a rotatable cover 41 which fits against the rear wall 2*a* and is rotatably mounted on the hub of the bearing member 12*a*. The cover 41 has holes 43 of the same shape and dimension as the holes 40, and by rotating the cover, the holes 40 can be uncovered or covered to any desired extent. An advantage of ad-

mitting variable amounts of air through the openings 40 is that the velocity of discharge of the ice from the machine can be varied. Where there is no need of moving the ice any great distance, then the apertures 40 can be covered or nearly covered. On the other hand, when it is desirable to throw ice at high velocity for a considerable distance, then the cover 41 is turned to fully open the apertures. In Fig. 7, the apertures are shown partially open.

A slightly different form of cutter tooth is disclosed in the modification of Figs. 6 and 7. Thus, where I disclose chisels 19 in Figs. 3 and 5, I disclose in place thereof rows of picks 44 in Figs. 6 and 7, these picks being mounted closely adjacent each other in rows of holes extending radially. These picks are found highly efficient in operation and have the advantage that they are cheaper to replace than are the relatively larger chisels.

Various departures from the specific construction shown in the drawings may be made without departing from the invention, and the latter is to be limited only to the extent set forth in the appended claim.

I claim:

An ice crusher and blower comprising a substantially cylindrical casing containing an imperforate rotor and having front and rear end walls, a shaft for said rotor extending through said rear wall, and bearing means for rotatably supporting said shaft, a rectangular window in said front wall of substantially the shape and dimension of the cross section of a standard cake of ice, means for supporting a cake of ice for feeding movement through said opening to said rotor, the cake substantially filling said opening while feeding therethrough, ice comminuting elements on the front face of said rotor, blower vanes on the rear face of said rotor, an air admission opening in said rear wall of said casing substantially centrally located behind said rotor, and a discharge duct extending from the periphery of said casing, said duct communicating directly with the interior of the casing on both the front and rear sides of the rotor whereby ice comminuted by said comminuting members on the front face of the rotor is entrained in a continuous blast of air created by said vanes through said inlet opening, for conveying said ice through said discharge duct

CHESTER McLAREN.