Oct. 17, 1950 G. C. PROUTY 2,526,272

ICE CRUSHING MACHINE

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FIG-1

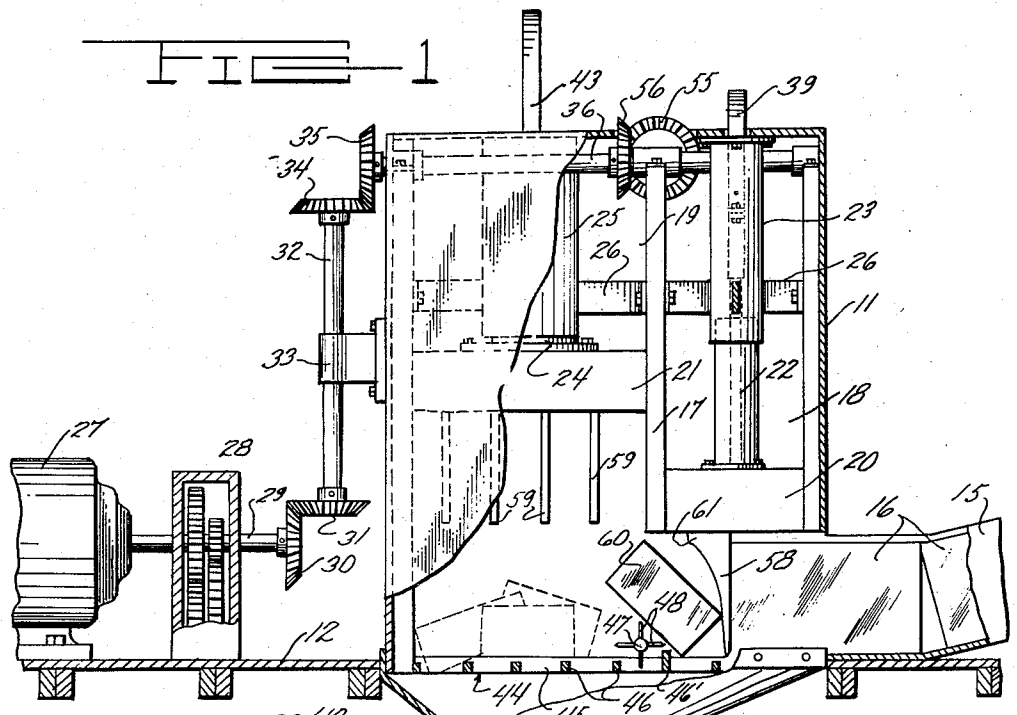
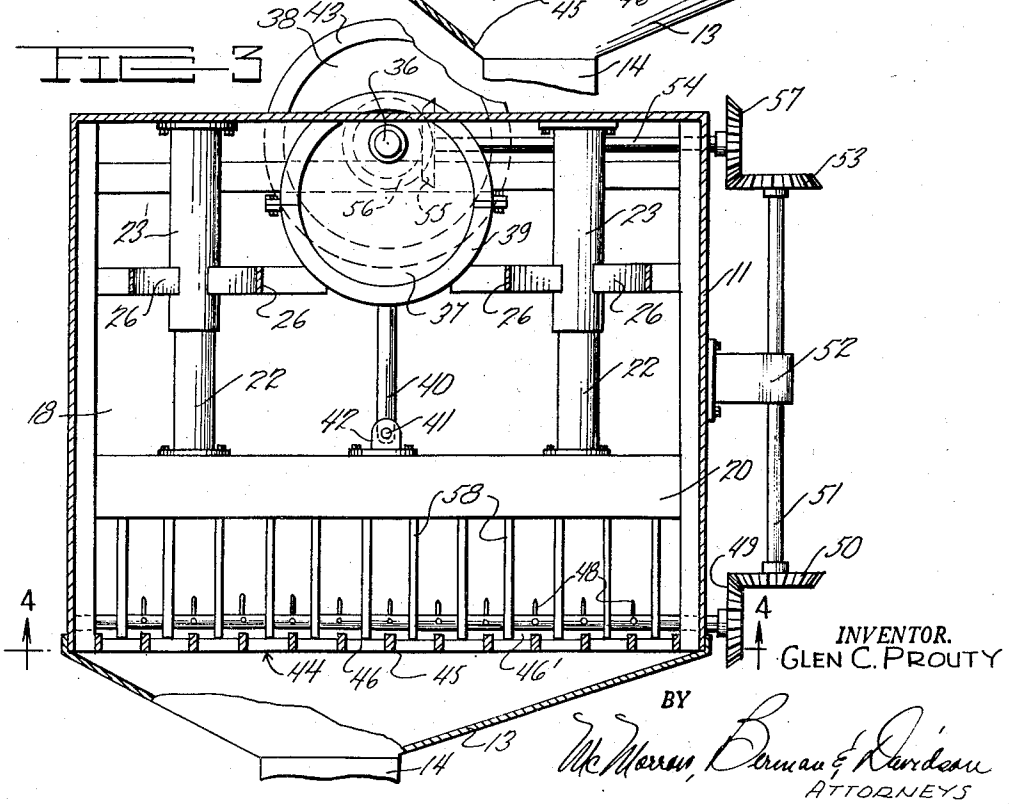


FIG-3



INVENTOR.
GLEN C. PROUTY

BY

McMorrow, Berman & Davidson

ATTORNEYS

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FIG. 2

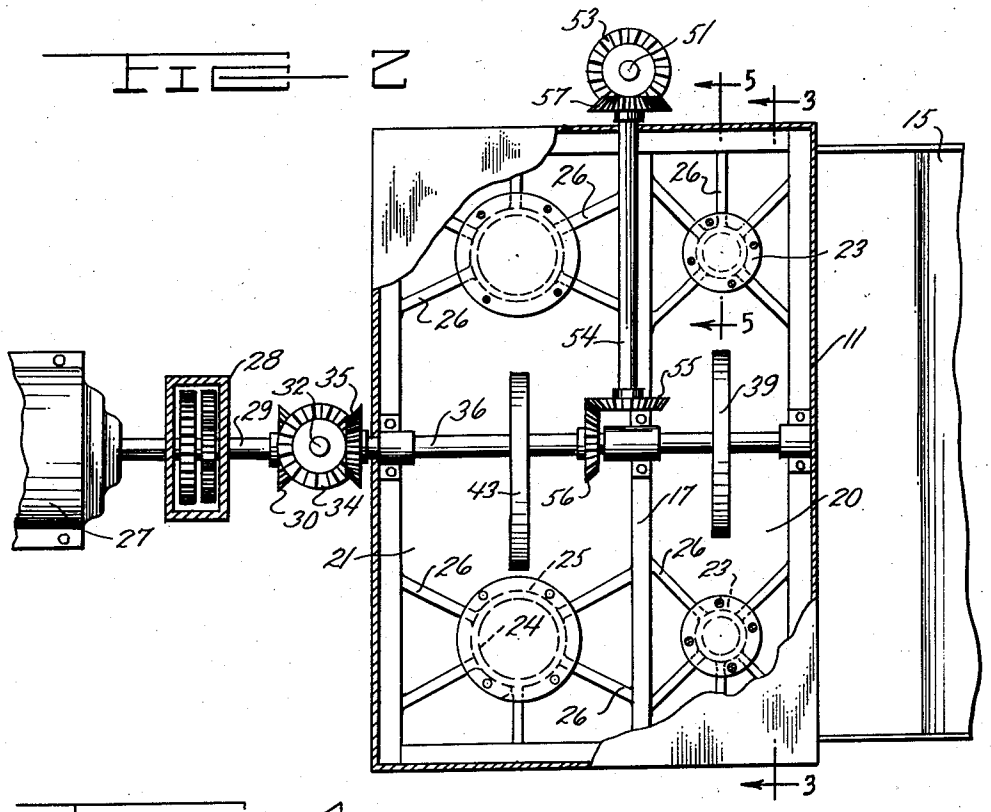


FIG. 4

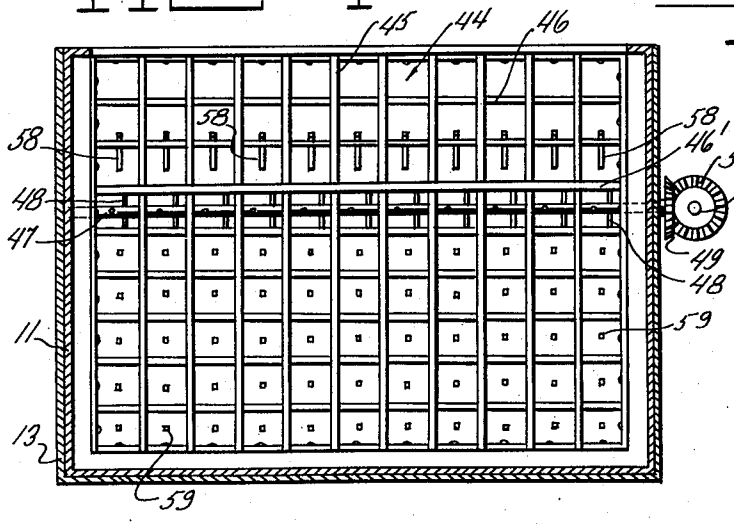
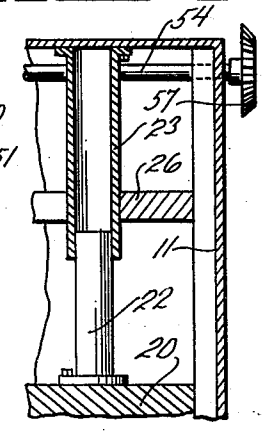


FIG. 5



INVENTOR.
GLEN C. PROUTY

BY

McMorrow, Berman & Davidson

ATTORNEYS

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ICE-CRUSHING MACHINE

Glen C. Prouty, Joplin, Mo.

Application March 8, 1949, Serial No. 80,225

2 Claims. (Cl. 241—270)

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This invention relates to crushing machines, and more particularly to a machine for producing crushed ice from slabs in an economical and efficient manner.

A main object of the invention is to provide a novel and improved ice crushing machine for producing crushed ice from slabs, said machine being very simple in construction, having a relatively large capacity, and producing crushed ice whose fragments are substantially uniform in size, which does not waste ice, and which operates in a completely automatic manner, requiring only the feding of slabs thereto.

A further object of the invention is to provide an improved ice crushing machine which is compact in size, rugged in construction, which provides a product substantially free from snow, and which utilizes the entire mass of the slab fed thereto to provide ice fragments of commercially acceptable size.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view, partly in cross-section, of an ice crushing machine constructed in accordance with the present invention.

Figure 2 is a top plan view, partly in cross-section, of the ice crushing machine of Figure 1.

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 2.

Figure 4 is a cross-sectional view taken on line 4—4 of Figure 3.

Figure 5 is a cross-sectional detail view taken on line 5—5 of Figure 2.

Referring to the drawings, 11 designates a generally rectangular housing which is mounted on the floor of the ice plant or on a suitable support, designated at 12. The bottom of housing 11 comprises a spout portion 13 connected to a discharge conduit 14, said spout portion extending through the floor or platform 12. Connected to the lower portion of housing 11 at one side thereof is a chute 15 through which slabs of ice, such as shown at 16 are fed into the housing.

Secured transversely inside the housing is a vertical partition wall 17 defining a first compartment 18, adjoining the connection to chute 15, and a substantially larger second compartment 19. Slidably positioned for vertical reciprocation in compartment 18 is a rectangular block 20. Slidably positioned in compartment 19 for vertical reciprocation therein is another rectangular block 21. Block 20 is provided with

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a pair of upstanding cylindrical guide posts 22 which are telescopically received in respective depending guide sleeves 23 secured to the top wall of housing 11. Similarly, block 21 is provided upstanding guide posts 24 which are telescopically received in depending guide sleeves 25 secured to the housing top wall. The respective guide sleeves 23 and 25 are rigidly braced within the compartments 18 and 19 by radially extending struts 26 connecting the guide sleeves to the various wall surfaces of said compartments, as shown in Figures 1 and 2.

Mounted on the support 12 adjacent housing 11 is a motor 27 whose shaft is provided with a gear reduction unit 28 which terminates in a driven shaft 29 carrying a bevel gear 30. Meshing with gear 30 is a bevel gear 31 carried at the lower end of a vertical shaft 32 which is rotatively supported in a bearing bracket 33 secured to housing 11. The top end of shaft 32 carries a bevel gear 34. Meshing with gear 34 is a bevel gear 35 carried on the end of a horizontal shaft 36 journalled in the upper portion of housing 11. Shaft 36 carries a first eccentric 37, located in compartment 18 and a second eccentric 38 located in compartment 19. Eccentric 37 has rotatively mounted thereon a peripheral eccentric ring 39 which has depending therefrom an arm 40. Arm 40 is pivotally connected at 41 to a bracket 42 secured to the midportion of block 20, as shown in Figure 3. Similarly, eccentric 38 has rotatively mounted thereon a peripheral eccentric ring 43 which is provided with a depending arm, not shown, pivotally connected to the midportion of block 21. As shown in Figures 1 to 3, the eccentric 37 is mounted so as to be 180° out of phase with respect to the eccentric 38 on shaft 36.

Designated generally at 44 is a grate secured in the lower portion of housing 11 over the spout portion 13, said grate being formed of evenly spaced longitudinal bars 45 connected by evenly spaced transverse bars 46. The top edges of bars 45 lie in a horizontal plane substantially flush with the bottom wall of the chute 15. The top edges of bars 46 all lie in a horizontal plane slightly below the plane of said chute bottom wall with the exception of one transverse bar 46' which rises slightly above said latter plane. Transverse bar 46' is located below compartment 18 inwardly adjacent the plane of the partition wall 17. Rotatively mounted in housing 11 adjacent bar 46' to the left thereof as viewed in Figure 1 is a transverse shaft 47 provided with radial projections 48. Shaft 47 is provided with

an external bevel gear 49 which meshes with a bevel gear 50 carried at the lower end of a vertical shaft 51. Shaft 51 is rotatively supported in a bearing bracket 52 secured to housing 11. The top end of shaft 51 carries a bevel gear 53. Journaled in the upper portion of housing 11 is a transverse shaft 54 carrying at its inner end a bevel gear 55 meshing with a bevel gear 56 carried on shaft 36. The outer end of shaft 54 carries a bevel gear 57 which meshes with bevel gear 53. Shaft 47 therefore rotates simultaneously with shaft 36.

Block 20 is provided with a transverse row of spaced depending picks 58. Block 21 is provided with a multiplicity of evenly spaced depending prongs 59 which are respectively centered with respect to the grate openings below the compartment 19.

In operation, a slab of ice 16 enters the housing 11 from the chute 15 and engages against the elevated transverse stop bar 46'. Shaft 36 is driven by motor 27 through the shafts 29 and 32 and the bevel gears associated therewith, causing block 20 to be reciprocated by eccentric 37, eccentric ring 39 and the connecting rod 40. The picks 58 move downwardly on the slab and cause a transverse chunk of ice, shown at 60 to be split off the slab 16.

The picks 58 have upwardly flared forward edges 61 which cause the chunk 60 to be tilted over the stop bar 46' onto the rotating toothed shaft 47 as the picks move downwardly toward the completion of their cutting stroke. Said toothed shaft 47 advances the chunk 60 onto the portion of grate 44 below the prongs 59. As the block 20 commences its upward stroke, the block 21 begins its downward stroke due to the 180° phase difference between the eccentrics 37 and 38. The prongs 59 engage the chunk 60 as block 21 goes through its downward stroke and cooperate with the grate 44 to shatter the chunk 60 into fragments.

Since the prongs 59 are centered with respect to the grate apertures, substantially uniform crushing forces are applied over the mass of the respective chunks 60 fed into the space below compartment 19, producing substantially uniform fragmentation of the chunks. The ice fragments drop through the grate apertures into the spout portion 13 and thence into the discharge conduit 14. The ice fragments may be collected from the lower end of conduit 14 in bags or other suitable receptacles for transportation to points of delivery.

It will be noted that the longitudinal bars 45 provide skid means facilitating the movement of the ice slabs 16 and the chunks 60 through the housing 11 from feed chute 15, to the toothed shaft 47 and thence into the space below prongs 59. Shaft 47 rotates counter-clockwise, as viewed in Figure 1, providing propulsion of the chunks 60 to the left, as viewed in said figure, whereby the chunks are fed continuously into the crusher space below the block 21.

While a specific embodiment of an ice crushing machine has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitation be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. An ice crushing machine comprising a housing, a transverse partition in the upper portion of the housing defining a forward and a rear compartment therein, a horizontal grate at the lower portion of said housing, a toothed shaft journaled transversely in the housing upwardly adjacent said grate and adjacent the plane of said partition, a transverse stop bar rising from said grate, forwardly adjacent said toothed shaft, a first block member mounted for vertical reciprocation in the forward compartment, a row of depending picks extending in a transverse plane with respect to the housing and depending from said first block member, said picks flaring upwardly in width in planes transverse to the partition, a second block member mounted for vertical reciprocation in the rear compartment, a multiplicity of evenly spaced depending prongs carried by said second block member, said prongs being substantially centered with respect to the grate apertures, means for simultaneously reciprocating the block members and rotating said toothed shaft, and means coupling said block members in opposite phase relation.

2. An ice crushing machine comprising a housing, a transverse partition in the upper portion of the housing defining a forward and a rear compartment therein, a horizontal grate at the lower portion of said housing, a toothed shaft journaled transversely in the housing upwardly adjacent said grate and adjacent the plane of said partition, a first block member mounted for vertical reciprocation in the forward compartment, a row of depending picks extending in a transverse plane with respect to the housing and depending from said first block member, said picks flaring upwardly in width in planes transverse to the partition, a second block member mounted for vertical reciprocation in the rear compartment, a multiplicity of evenly spaced depending prongs carried by said second block member, said prongs being substantially centered with respect to the grate apertures, means for simultaneously reciprocating the block members and rotating said toothed shaft, and means coupling said block members in opposite phase relation.

GLEN C. PROUTY.

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