

July 16, 1940.

G. J. MOELLER

2,208,040

ICE CRUSHER

Filed Sept. 10, 1938

2 Sheets-Sheet 1

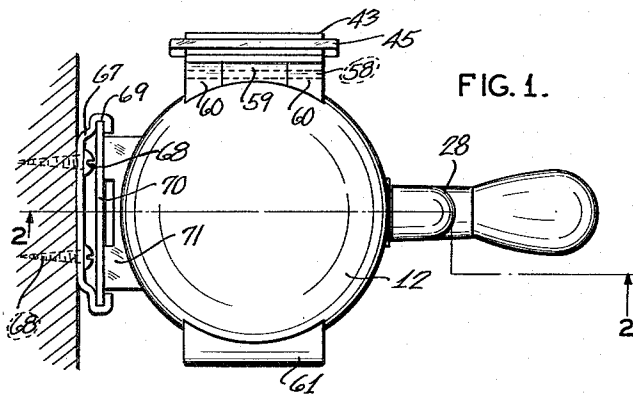


FIG. 1.

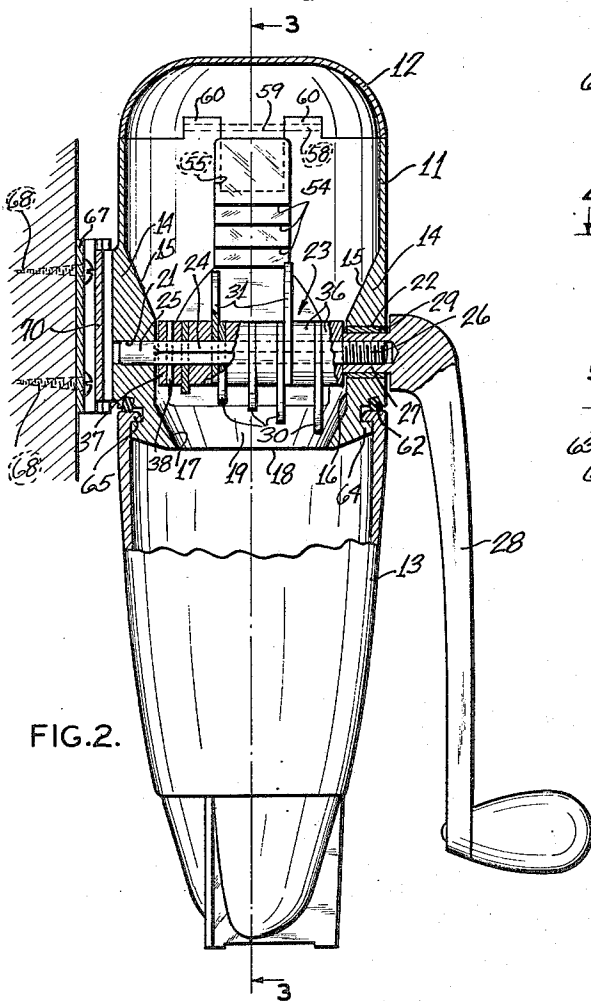


FIG. 2.

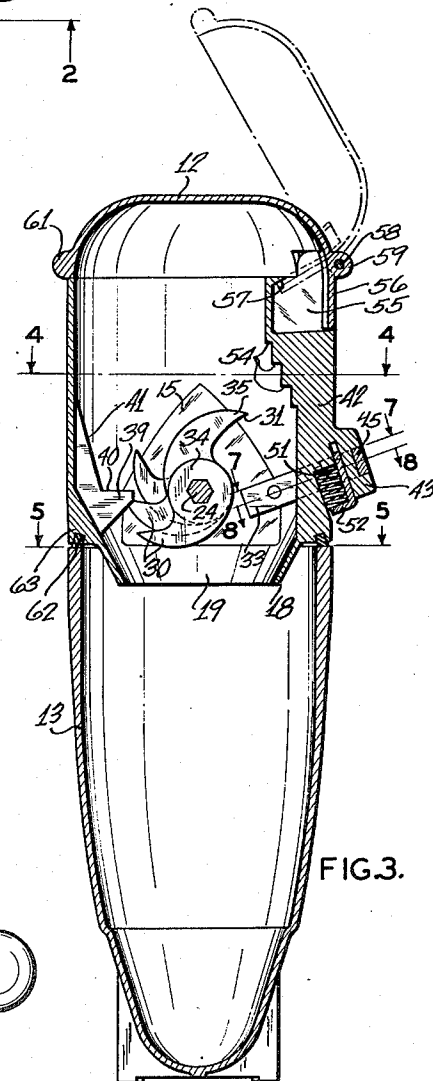


FIG. 3.

INVENTOR
GEORGE J. MOELLER

BY

Lawrence H. Cohn
ATTORNEY

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G. J. MOELLER

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2 Sheets-Sheet 2

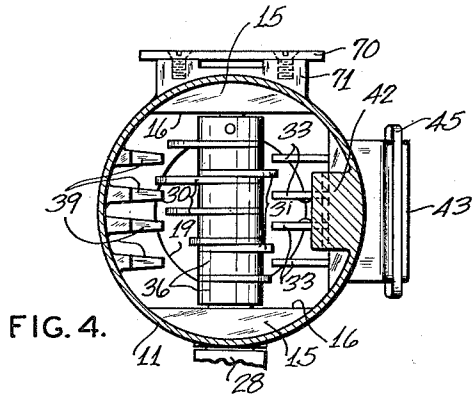


FIG. 4.

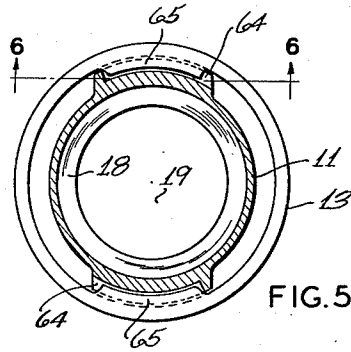


FIG. 5.

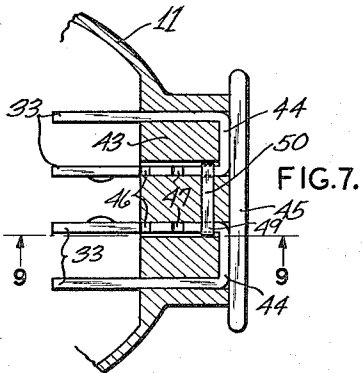


FIG. 7.

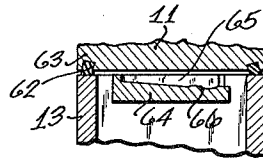


FIG. 6.

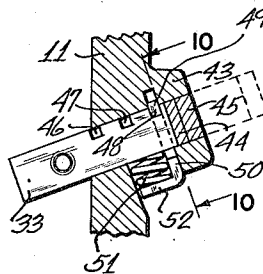


FIG. 9.

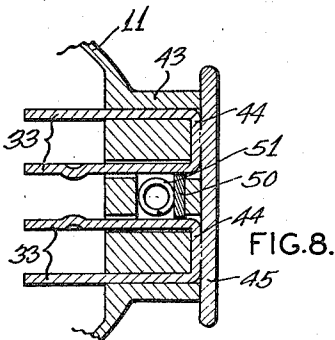


FIG. 8.

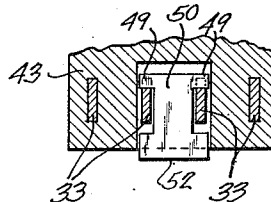


FIG. 10.

INVENTOR
GEORGE J. MOELLER

BY *Lawrence H. Coker*
ATTORNEY

UNITED STATES PATENT OFFICE

2,208,040

ICE CRUSHER

George J. Moeller, St. Louis, Mo., assignor to
Dazey Churn & Manufacturing Company, St.
Louis, Mo., a corporation of Missouri

Application September 10, 1938, Serial No. 229,277

1 Claim. (Cl. 83-63)

My invention relates to machines for disintegrating ice, and more particularly to an improved machine of this character which is especially adapted for breaking small ice cubes, such as are produced in domestic mechanical refrigerators, into particles of suitable size for cooling beverages or other household uses.

An object of the present invention is to provide a self-contained device of the kind described which includes a housing or casing structure that completely encloses and forms a substantially water-tight chamber for the ice before, during and after the breaking operation, preventing the escape of water or ice particles which otherwise would tend to create a wet and untidy condition in the kitchen.

Another object of my invention is to provide an improved domestic ice-breaker of this character which embodies a housing or enclosure having a removable portion that forms a receptacle for the broken ice.

Yet another object is attained in the provision of improved means for detachably mounting the aforesaid receptacle portion of the enclosure on the main body portion whereby a liquid-tight junction is formed therebetween.

Still another object is to provide a highly efficient ice-breaker which is especially convenient for use in domestic kitchens or wherever the space available for culinary equipment is limited. This object is attained by the provision of a relatively small, compact self-contained unit embodying means which enables it to be readily attached to a wall or the like, for service, and thereafter removed and stored away when not in use. When mounted for operation, the ice-receiving receptacle suspends from the main body portion. This arrangement is advantageous in that it eliminates the necessity for a base plate or platform for the ice receptacle which would increase the size and weight of the device. Moreover, the closed construction renders my device especially applicable for use without an underlying table or other means, which, in most conventional domestic ice crushers, is necessary for catching escaping ice and water particles.

A further important object of my invention is to provide a device of the kind described having an improved ice-breaking mechanism, the improvement being particularly directed to adjustable means of simple construction for varying the size of the resultant ice particles.

The foregoing and other objects and advantages will more readily appear from the following detailed description of a preferred exemplary

embodiment of the invention, and from the accompanying drawings in which:

Fig. 1 is a plan view of the device; Fig. 2 is a sectional elevation taken at line 2-2 of Fig. 1; Fig. 3 is a sectional elevation taken at line 3-3 of Fig. 2; Figs. 4 and 5 are sectional plan views taken at lines 4-4 and 5-5, respectively, of Fig. 3; Fig. 6 is a sectional elevation taken at line 6-6 of Fig. 5, and showing the bayonet connection for securing the receptacle to the hopper; Figs. 7 and 8 are sectional views taken at lines 7-7 and 8-8, respectively, of Fig. 3, showing certain details of the adjustable crushing bars; Fig. 9 is a section taken at line 9-9 of Fig. 7, and Fig. 10 is a sectional view taken at line 10-10 of Fig. 9.

Referring now to the drawings by characters of reference, the body portion 11 of the crusher is of the form of a magazine or hopper and is adapted to receive ice to be broken through an upper end opening which normally is closed by a hinged cover element 12. The lower portion of the hopper forms a crushing chamber and the broken ice is discharged therefrom into a cup or receptacle 13 which is suspended from and is detachably connected to the body member. The body member is preferably produced as a unitary, substantially tubular metal casting and the lower portions 14 of its opposite side walls are of relatively increased thickness to provide adequate bearing areas for a rotatable crusher member, hereinafter designated and described, and serving further to strengthen the casting in the crushing zone. The inner surfaces of wall portions 14 are defined by inwardly and downwardly sloping shoulders 15, confronting vertical faces 16, and conical lower surfaces 17 that merge laterally with the inner surfaces of apron flanges 18 in the formation of a substantially conical discharge passage 19.

The wall portions 14 are provided with aligned transverse bores 21 and 22 forming bearing seats for the rotatable crusher assembly, designated generally at 23. This assembly comprises a shaft 24 which, except for its end portions, is of non-circular section, in the present example being shown as hexagonal. The end portion 25 of the shaft is journaled in the bearing aperture 21 and the opposite end 26 is threaded for connection with the hub portion 27 of an operating handle or crank 28, the hub portion 27 being journaled in a bearing sleeve 29 lining the bore 22.

Mounted on shaft 25 for rotation therewith are a plurality of claw-like crushing jaws or teeth which may be conveniently produced from sheet

metal stock and are suitably hardened to render them strong and durable. The shaft 24 is provided, in the present exemplary embodiment, with five crushing jaws, each designated 30, identical in shape and size, and two additional jaws, each designated 31, which are similar in shape to the jaws 30 but of greater radial extent. Like jaws 30, the larger jaws 31 serve to crush or disintegrate the ice and in addition serve to pick up ice fragments and carry them to the grate bars 33, to be hereinafter described, where the actual breaking takes place. Each of the jaws 30 and 31 is characterized by a substantially disc-like hub 34, provided with a central opening of the size and shape of the shaft, and projecting from the hub is a claw portion 35 that tapers to a sharp point and curves away from the shaft in the direction of normal shaft rotation. Jaws 30 are disposed in spaced relation along the shaft and are so maintained by intervening spacer sleeves 36. The jaws and spacer sleeves are tightly clamped together between an end collar 37 secured to the shaft by a pin 38, and the hub portion 27 of the crank 28. As best appears from Fig. 3, the jaws 30 are angularly displaced relative to each other so as to function successively on pieces of ice disposed adjacent the stationary jaws or grate bars 33. Accordingly, in most instances only one of the jaws will exert crushing pressure at a particular time, and since the crushing force is concentrated at one, or possibly two of the jaws, only a moderate degree of force need be applied to the crank.

In the presently preferred arrangement shown, the consecutive angular displacement of the jaws 30 is approximately 30 degrees, and jointly they occupy about 120 degrees of their circle of revolution. The larger jaws 31, located near the center of the crushing chamber, are angularly displaced relative to each other, and extend from the side of the shaft opposite to that occupied by the group of jaws 31, as best appears from Fig. 3.

Formed integrally with the wall of the body member 12 directly opposite to the grate bars 33 are a series of vertical fins or ribs 39, each thereof being disposed in a plane mid-way between the planes of adjacent jaws 30. The fins 39 are shaped to provide horizontal ledges or shoulders 40 at the level of the shaft 24, that prevent pieces of ice from dropping through the crushing zone without being acted upon by the jaws, and sloping edges 41 above these shoulders that serve to direct the ice toward the center of the crushing chamber where it can more readily be picked up by the rotating jaws.

The so-called back wall of the body member is relatively thick in the vicinity of the crushing zone, as indicated at 42, due to the provision of additional wall metal at the inner side of the body member and also to a substantially rectangular lug or boss 43 that projects angularly from the outer surface of the wall. This wall section is provided with oblique, slot-like passages, each disposed in a plane parallel to, and mid-way of the rotatable jaws 30. These passages serve to accommodate the grate bars 33 which are longitudinally adjustable therein. As best appears from Fig. 7, the grate bars 33 consist of U-shaped metal strips having connecting portions 44 which are secured, as by spot welding, to a yoke bar 45 that serves as a finger piece when adjusting the bar assembly. The two intermediate grate bars are provided with spaced notches or recesses 46, 47, 48 for the reception, selectively, of laterally projecting ears 49 formed on an L-

shaped lock piece 50. The member 50 extends transversely between the two intermediate grate bars and is positioned in a recess in the boss 43. A spring 51 in such recess bears downwardly upon the bent end 52 of the lock piece, tending to maintain the same in locked relation with the grate assembly. To effect an adjustment of the grate bars, the user applies his finger to end portion 52 and moves the lock piece upwardly against the action of spring 51 sufficiently to displace the ears 49 from the grate bar recesses, whereupon the bar assembly may be moved toward or from the crusher rotor as desired. When the grate bars are set in their innermost position, shown in Fig. 3, the ice is required to be broken into small pieces prior to discharge, and when in a relatively retracted position ice fragments of larger size are permitted to pass the grate bars. Thus the crusher mechanism is adjustable to permit of selective variation in the size of the resulting fragments.

Formed on the inner surface of the rear wall 42 above the crusher mechanism are a series of stepped shoulders 54 which function in the manner of ratchet teeth to engage large pieces of ice and prevent upward displacement thereof during the crushing operation. A pocket or recess 55 is formed in the back wall 42 at the upper end of the hopper for accommodating a tail piece 56 that extends from the cover element 12, the tail piece 56 being adapted to abut a lip 57 on the hopper to limit the extent of opening movement of the cover element. In Fig. 3 the broken line showing of the cover element 12 illustrates the preferred extent to which the same may be opened, and clearly shows that the cover element will gravitate to closed position when released. The cover element is hingedly connected to the hopper by a pintle 58 which extends through knuckles 59 and 60, respectively, on the cover element 12 and hopper body 11. The cover element is adapted to be manipulated to open position by a projection 61 formed on its forward side.

As a means for providing a water-tight seal at the junction of the receptacle 13 and the crusher body, an annular rubber gasket 62, secured in and projecting outwardly from a groove formed in an annular shoulder surface 63 that surrounds the discharge apron 16, is adapted to engage the upper edge of the receptacle. Connecting means of so-called bayonet type are provided for securing the receptacle to the crusher body. Such means comprise lugs 64 (Fig. 2), formed at opposite sides of the discharge passage 19, the lugs 64 being channeled to receive inwardly directed lips 65 formed on the upper margin of the receptacle. As best appears from Fig. 6, the under surfaces of lips 65 are slightly inclined and their mating channel surfaces are likewise inclined. Accordingly, when the receptacle is properly presented to the hopper body and turned to effect an engagement of the lugs 64 and lips 65, a wedging action takes place which causes the receptacle to be drawn upwardly into pressure, liquid-tight engagement with the resilient gasket. The aforementioned mating surfaces of the lugs 64 and lips 65 are formed with interfitting grooves and ridges, indicated generally at 66, that prevent the lips from becoming unintentionally released from the lugs.

The entire assembly is adapted to be mounted on a wall or other vertical support by means of a mounting plate 67, secured to the wall as by screws 68, the opposite vertical edges of which

plate are bent to form opposed channels 69 of downwardly converging trend. A plate 70, secured to a base part 71 formed integrally on the crusher body is adapted to be inserted into the upper ends of the channels which are formed as previously mentioned, so as wedgingly to engage the plate 70. The described mounting means enable the crusher assembly to be rigidly attached to a wall or other support, yet permit the device to be readily removed for storage purposes when not in use.

While I have described my invention with reference to a presently preferred embodiment thereof, it will be understood that various changes may be made in the device set forth herein without departing from the spirit and full intendment of the invention as defined by the following claim.

I claim:

20 In an ice crusher, a vertically disposed tubular body, a horizontally disposed cylinder mounted for rotation within the body, said cylinder having a plurality of laterally projecting jaw ele-

ments spaced therealong, a fixed grate structure on the body at one side of said cylinder and an adjustable grate structure on the body at the opposite side of the cylinder, said fixed grate structure comprising a series of fin-like projections formed integrally on the inner surface of the body and arranged in spaced, interleaving relation to the rotatable jaw elements, said projections coacting to provide a horizontal shelf substantially in the horizontal plane of cylinder axis, edge portions of said projections above said shelf sloping downwardly and inwardly thereto; said adjustable grate structure comprising a plurality of parallel bars that extend transversely through and are adapted for endwise adjustment in the body wall to vary the spacings of their inner ends with respect to said cylinder, a cross member to which the outer ends of said bars are rigidly secured, and means for locking the adjustable grate structure in any of a plurality of adjusted positions.

GEORGE J. MOELLER.