July 5, 1960 V. A. DAVIS 2,943,461

ICE MAKING MACHINE

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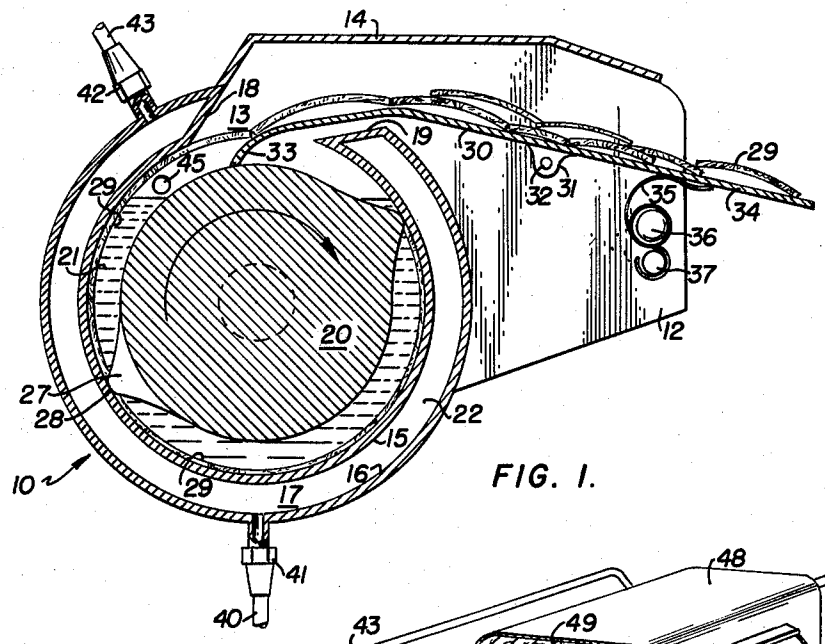


FIG. 1.

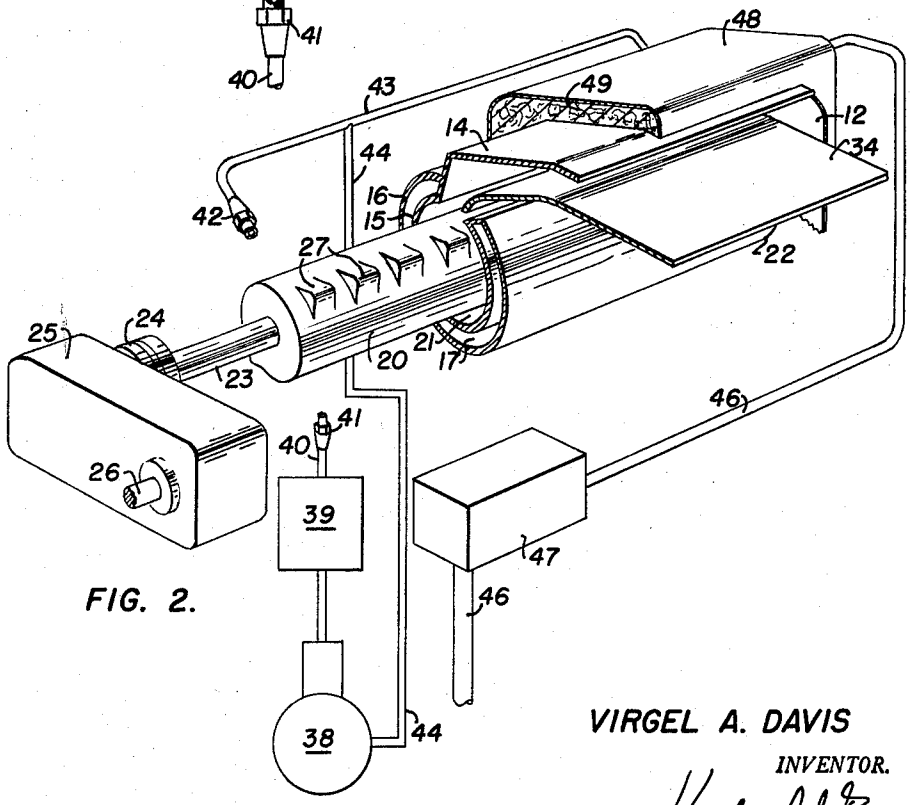


FIG. 2.

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ICE MAKING MACHINE

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2 Claims. (Cl. 62—354)

This invention relates to ice makers capable of continuously ejecting pieces of ice during their operation.

An object of the invention is to provide a machine of the described class which will eject all of the ice made, thus preventing clogging or jamming ice in the water chamber or the ejector passage.

Another object is to provide an automatic ice making machine capable of preventing an accumulation of ice on the rotor which is in continuous operation while ice is being made.

Another object of the invention is to provide a scraper or tooth arrangement on the rotor of the invention, and which scraper arrangement, in conjunction with the ejector mechanism, is capable of breaking the ice made into substantially uniform chunks.

A particular object is to provide an automatic ice making machine of the described class including a flood type evaporator and whereby twice as much ice may be made during a period of time as compared with ice makers having conventional coil type evaporators.

These and other objects of the invention will become apparent from the following description and the accompanying drawing, wherein:

Figure 1 is a vertical transverse section of an ice maker embodying the features of the invention.

Figure 2 is a broken perspective view of the invention and showing a schematic arrangement of a refrigeration system connected therewith.

Referring to the drawing, a cylindrical evaporator **10** is supported at the ends thereof by vertical plates **11** having lateral extensions **12** for supporting mechanism to be described. The evaporator **10** is provided with an ejector or delivery opening **13** in the upper length thereof and which opening is provided with a cover **14** which extends laterally toward the extending ends **12** of the end plates **11**.

The evaporator **10** is comprised of inner and outer cylindrical walls **15** and **16** spaced to provide a refrigerant chamber **17** therebetween. The upper ends of the last referred to chamber **17** are provided with longitudinal closures **18** and **19** on each side of the delivery opening **13**, and which closures are angularly disposed upwardly and toward the laterally extending end of the cover **14**.

A cylindrical rotor **20** is axially mounted within the inner cylindrical wall **15** of the evaporator **10** and is spaced therefrom to provide a water or freezing chamber **21**. The evaporator **10** includes closed ends **22** and through which a shaft **23** supporting the rotor **20** extends. The shaft **23** is connected with a coupling **24** which, in turn, is connected with a reduction gear box **25** including a projecting drive shaft **26** supplying power for rotating said rotor.

Substantially triangular scrapers or teeth **27** project from opposite sides of the rotor **10** and are in staggered arrangement relative to each other. The scrapers **27** are of uniform width and the spaces therebetween are also of the same width. The tapered surfaces of the substantially triangular scrapers **27** are forwardly and rearwardly positioned relative to the direction of rotation of the rotor **20**, as shown in Figure 1. Projecting ends **28** touch or nearly touch the inner surface of the inner evaporator wall **15** where the ice **29** is formed.

A substantially horizontal ejector plate **30** is pivotally mounted on the end plates **11** by means of ears **31** on the lower end surface of said plate and by means of pins **32** passing therethrough and supported by said end plates. The ejector plate, inwardly of its pivot, is downwardly formed, as at **33**, to make sliding contact with the surface of the rotor **20** and the scrapers **27**. The downwardly formed portion or bend **33** is designed to scrape the teeth **27** on both the forward and rearward sides thereof as the rotor **20** is turned. Also, the bend **33** tilts and breaks the ice **29** as the same rises on the ejector plate **30**, and the continuous rotation of the rotor and the last referred to action forces the ice outwardly across said plate. A portion of the plate **34** extends beyond the supporting pivot pins **32** and thus provides a surface for dispensing the ice **29** made by the machine. The inner edge of the ejector plate **30** is maintained against the rotor **20** and scrapers **27** by means of a coil spring **35** mounted on pins **36**. One end of each spring bears against the lower outer surface of the ejector plate **30** and the remaining end of which is connected with another pin **37** spaced from the first said pin for maintaining said spring in its described position.

The refrigeration system schematically shown in Figure 2 includes a compresser **38**, a condensor **39** and a supply line **40** which is connected with the refrigerant chamber **17** in the lower portion thereof by means of a fitting **41**. Other fittings **42** are connected with the upper portion of the refrigerant chamber **17** at each end thereof and, in turn, are connected with the suction line **43** which is connected with a return line **44** extending to the compressor **38**. A water inlet **45** is provided in one of the evaporator ends **22** above the water level thereof, and which inlet is connected with a water supply line **46** having a water level control **47** connected therein. It is to be understood that the housing **48** fragmentarily shown in Figure 2 extends over the cover **14** and along the sides of the evaporator **10**, although not shown in detail in the drawings. The housing **48** encloses insulating material **49**.

In operation, water is provided in the water chamber **21** to a level just below the inlet **45**, and the rotor is turned in a direction as indicated by the arrow shown in Figure 1. By reason of the chamber of flood type evaporator described, ice forms on the entire surface of the inner wall **15**, and as the rotor turns the ice is turned and lifted on the depending inner edge **33** of the ejector plate **30**. The operation last referred to breaks the ice and the additional ice being raised pushes the broken ice **29** outwardly across said plate. The thickness of the ice **29** may be determined by the rate of rotation of the rotor **20**. If desired the rotor **20** may be stopped for a period of time to allow all of the water in the chamber **21** to freeze and form thick ice. If the latter operation is selected, the system may be recycled to free the ice from the inner wall **15** and the rotor then actuated to move the ice outwardly in the above described manner.

The invention is not limited to the exemplary construction herein shown and described but may be varied within the scope of the appended claims.

What is claimed is:

1. In an ice making machine, the combination of an evaporator having a horizontal cylindrical inner wall and having an ice discharge opening in the top and extending the length of said cylinder and said inner wall, a cylindrical rotor axially mounted in said evaporator and spaced from the inner wall thereof, horizontal rigid scrapers projecting from said rotor and extending to said inner

wall of said evaporator, said scrapers having tapered forward and rear outer surfaces defined by the direction of rotation of said rotor, and a pivotally mounted ejector plate extending into and outwardly of said ice discharge opening, one side edge of said ejector plate being in sliding contact with said rotor and said scrapers.

2. In an ice making machine as defined in claim 1, the construction wherein said horizontal scrapers are comprised of horizontal rows of teeth, said rows of teeth being spaced 180° circumferentially on said rotor, the teeth of one row being staggered with respect to the other row so that each row of teeth pass over an area of said inner wall of said evaporator different from that of the other row.

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