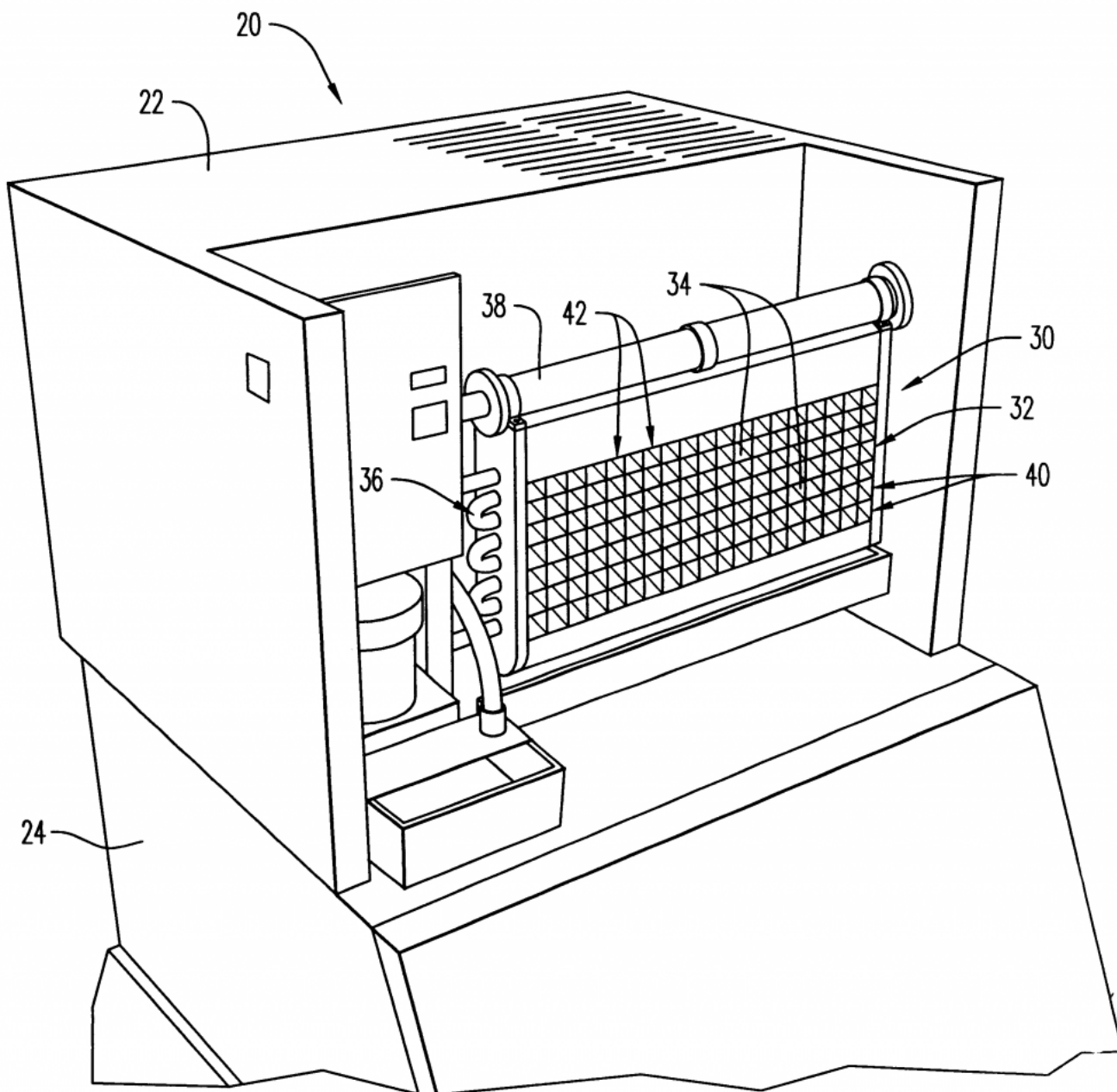


# Ice Machines – Cuber, Flaker & Nugget Basics



There are several types of Ice Machines but in this article we will focus on Cuber style and Flaker or Nugget style. Both types produce Ice but the process of freezing and harvesting is a little different. The application in which the Ice will be used will determine what style of machine is needed. I primarily work with Restaurants and Hospitals so my article

will be geared in that direction.

Let's start by simplifying the ice making process, if we take water and circulate it over an evaporator that is below freezing we will at some point start to freeze that water, once our Ice has formed we then harvest the ice and start our process again. That's about as simple as it gets

The steps to make Ice seem simple take water and freeze it, but It's not that simple. Making Ice cubes is actually a pretty complicated process, with several critical steps that must be met for the process to work correctly. The first step starts with properly cleaning the water that will be made into ice to remove any impurities, water itself naturally contains minerals and those minerals are an Ice Machines worst enemy. The minerals lead to calcium buildup which causes issues with the ice machine. A quality ice machine install will have a high quality water filter system installed that was sized properly and has the appropriate filters inside that are chosen after a water quality test has been performed. Once we have properly filtered water we bring the water into a reservoir inside the machine and the water waits until the machine is ready to make Ice.

Among all the ice machine manufacturers there are several methods that the machine will tell itself that the ice storage bin is low on Ice and to turn on, the most common methods are a thermostat and or some sort of mechanical control that is actuated by ice buildup, subsequently telling the machine that the ice is low and it's time to turn on.

### **Cuber style ice machines**

Assuming the machine is ready to turn on, most brands of ice machines will start in a pre-chill, which means we cool the evaporator with no water running over it, this is done to try and prevent slush from forming. Then by means of a water pump the machine will start to circulate the water over the

evaporator, and that water will continually run over the evaporator and down into the sump than it will be pumped over the evaporator again, each time it passes over the evaporator the water will get colder and colder and eventually a little bit of the water will start to freeze to the evaporator plate, this process will continue over and over again until the ice is the proper thickness. The thickness can be determined by many methods including a thickness sensor, water level monitoring, and or a timer. Once it's time to harvest the ice the most popular method is to introduce hot refrigerant from the discharge of the compressor into the evaporator and subsequently melt the ice off the evaporator from the inside out while running a little bit of water over the cubes to assist dropping the cubes off the evaporator. The harvest cycle is usually terminated by a timer that is in the circuit board. Each manufacturer has their own unique way of making and harvesting the ice. With all cuber style ice machines the harvest cycle is very dependent on maintaining an adequate high side pressure as their defrost depends entirely on it. When the machine is self contained and located indoors its not too hard to maintain the proper head pressure because the building will likely be conditioned, however on remote systems where the condenser is located outside we utilize head pressure control valves (headmasters) to back up the refrigerant in the condenser to reduce the condensing capacity of the condenser and subsequently raise the head pressure.

### **Flaker or Nugget style Ice machines**

Nov. 2, 1965

A. F. CONTO

3,214,935

ICE FLAKE MAKING MACHINE HAVING A REMOVABLE AUGER

Filed Jan. 30, 1963

2 Sheets-Sheet 1

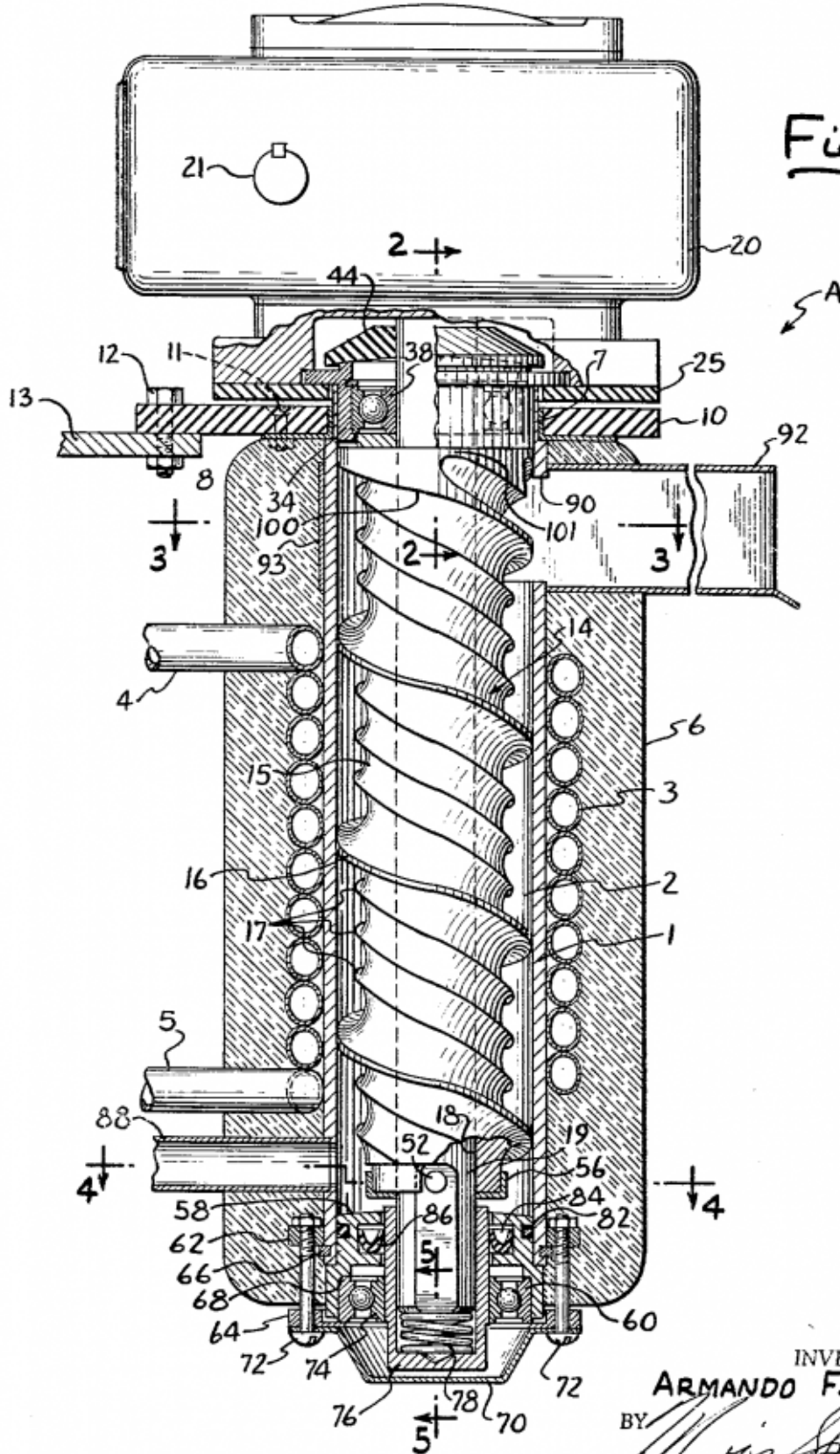


Fig. 1

INVENTOR  
ARMANDO F. CONTO  
BY *W. S. Spector*  
ATTY.

These machines have a unique way of making ice they utilize a round cylinder evaporator that has an auger inside of it that is turned by a high torque gear motor. The auger sits directly in the center of the evaporator with less than 1/16th of an inch clearance on either sides and the auger is always spinning it has the shape of a corkscrew. The machine will have a water reservoir that supplies water to the evaporator whenever it gets low. The machine will start to freeze the water and as it becomes ice the continually turning auger will force the ice up to the top of the evaporator and out of a nozzle that will shape the ice into the desired style (Crushed, Flaked, and or Nugget). It is important to notice that with this style of ice machine the harvest cycle happens when the ice gets thick enough for the auger to scrape it off and it both freezes and harvests the ice at the same time.

– Chris Stephens

P.S. – we have a new podcast out on ice machines [HERE](#) enjoy