process of passing from a liquid to a gaseous state, are bound to absorb a certain amount of heat.

Mr. Perkins intended to use sulphuric ether in the compressor which he patented, but the experiments were made with a liquid produced by the distillation of india rubber, but of which nothing definite can be learned. It was the intention of Perkins to establish an ice factory in the river Thames, by putting some of these machines in barges, and driving them by paddles which were to be turned by the ebb and flow of the tide. The ether machine is now obsolete because of its being so highly inflamable.

The three principal refrigerating agents are ammonia, carbon dioxide, and sulphur dioxide.

All gases have been liquified, hydrogen is one of the most difficult gases to liquify, this has been done by Professor Dewar, and his experiments show that it boils at atmospheric pressure 440° below zero, he claimed it was by far the coldest liquid known. But Professor Kamerlingh Onnes, of Leyden, six years ago announced that he had liquified helium, the most intractable of all gases, its boiling point is 456° below zero, this is astonishingly near the absolute zero mark which is 460° below zero Fahr.

I will now take ammonia gas which seems to be the most used for refrigerating purposes, its boiling point at atmospheric pressure is 28.5° below zero, its composition is one part nitrogen to three parts of hydrogen, it is easily liquified at a pressure anything above ninety pounds per square inch, this is the first step called the compression side, the second step is the condensing side where the gas circulates through water cooled pipes, gives off its latent heat, and liquefaction takes place, a third is the expansion side, wherein the liquified gas can re-expand, and perform its work of cooling by extracting heat from its surroundings. The absorption machine consists of a generator, an analyzer rectifier, condenser, a cooler, an absorber, an exchanger, and an ammonia pump.

I have here a blue print showing part of one of the first ammonia ice making machines in which aqua ammonia is used. A, is the aqua ammonia; E, is the ammonia gas going over to the condenser; O, is the weak liquor line going over to absorb the expanded gas, and T, is the rich liquor being pumped back to the generator. A fire was kept burning (the same as a boiler) under the generator, and this drove off the ammonia gas from the water, and up through the trays of the analyzer, up through the gas line E. A safety valve was placed on the top in case the pressure got too nigh, and a pipe led from it into a vessel filled with water which absorbed the escaping gas. The absorption machine up to the present time