THE PATENT ICE MACHINE.

An interesting case pertaining to the artificial production of ice has lately occupied the attention of the Commissioner of Patents. We allude to the application of F. P. E. Carré for an extension of his patent for ice machines, patented in France in 1859, and in this country in 1860.

The Commissioner has refused the petition for extension, and the invention is now public property.

The general method of effecting congelation by artificial means is to make use of a liquid which will energetically assume the gaseous state at a low temperature. In passing from the liquid to the gaseous state, the gas takes up a large amount of heat, and it draws this heat from whatever body it happens to be in contact with. This phenomenon may be readily illustrated by pouring a few drops of water upon a plate, and resting the bottom of a watch crystal on the plate in contact with the water. If now a small quantity of ether is placed in the watch crystal, the ether will evaporate or assume the gaseous form with great rapidity, and will draw so much heat from the water as to freeze it. This is the general principle on which most of the ice machines operate, and various refrigerating liquids are employed. In some of the machines ether is used, in others sulphuret of carbon, in others the light liquids from petroleum. These substances, after having passed from the liquid to the gaseous form, may be again restored to the liquid condition by the application of pressure, to wit, nearly 100 lbs. to the square inch. For this purpose pumps worked by steam engines are usually employed, but the great pressure of the gas results in much leakage and consequent loss of power; and until Carré brought out his improvement, the business of making ice was always attended with difficulty and expense.

In the Carré apparatus, a boiler containing ammonia and water is used, to which heat is applied, and pressure produced whereby the ammoniacal gas is driven over and condensed in a suitable receptacle in liquid form. The pressure is then shut off, when the ammonia immediately begins to boil and expands into the gaseous form with energy. The chamber in which the ammonia is allowed to expand surrounds a vessel of water, from which the expanding gas absorbs caloric, and the water congeals. The ammoniacal gas is then brought into contact with cold water, by which it is absorbed, and the ammonia water is then returned to the boiler and again used in the manner described. The process of ice manufacture is thus made continuous. There is little or no waste of ammonia, for it simply circulates around through the apparatus in pipes and chambers, condensing at one point and expanding at another as required, no pumps being required to effect the condensation.

The wonderful absorption, by water, of ammonia renders the use of this agent especially advantageous over any others at present known, for the purpose of ice making. At the ordinary temperature, water absorbs over seven hundred times its volume of ammonia, while the latter may be readily expelled from the water by the application of heat. It requires a temperature of 103° Fahr. below zero to solidify liquid ammonia. Placed in an iron vessel, it produces, at a temperature of 50° Fahr. a pressure of 97½ lbs. to the square inch. It was used at one time in New Orleans as a motor for a street car, an engraving of which appeared some time ago in our paper.

It appears, from the proceedings before the Commissioner of Patents, that the Carré ice machine is now in extensive and successful use in various parts of the country, especially at the South. The city of New Orleans is chiefly supplied with ice made by this apparatus, which furnishes ice for $5 a tun less than the price at which it can be imported from the North. The Carré machine is one of the most valuable inventions of the day, and it is not therefore surprising that the makers of all other ice machines, who have heretofore been compelled to use condensing pumps, should appear in full force at the Patent Office, to prevent the extension of the Carré patent. In this they have succeeded; and now they may throw aside their steam engines, discard their expensive pumps, and adopt the simple, effective and brilliant invention of Carré.

What surprises us is that the Commissioner of Patents should have rejected Carré's petition on the slender reasons that he assigns. He states that Faraday bent a glass tube into U form, and put ammoniated chloride of silver in one end, to which heat was applied. The result was that the ammonia was driven over and liquefied in the opposite end of the tube, which he now dipped in water. The heat being removed, the liquefied ammonia then expanded into gas, extracted caloric from the water and congealed it, and the gas went back to the other end of the tube and was again absorbed by the chloride of silver.

The Commissioner states that all that Carré did was to take this principle, first illustrated by Faraday, and substitute it, in ice machines, in lieu of the exhausting and condensing pumps used in Twining's, Perkin's and other ice apparatuses. Carré's labors during a period of thirteen years netted him $65,000, or $5,000 a year, which the Commissioner thinks is sufficient compensation.

This decision of the Commissioner, drawn up by a Board of Examiners in Chief at the Patent Office, is only one more illustration of the worthlessness of the Washington examinations, by which inventors are too often deprived, not only of credit for their discoveries but of substantial benefit.

What Carré did was to give to the public a new and splendid refrigerating apparatus, whereby cooling chambers for the preservation of important articles of food, and the production of ice, could be readily and economically effected. This was a great achievement, something never done before and entitled the author to the highest consideration as a public benefactor. The economic advantages conferred upon this country, by the introduction of Carré's invention, already amount to millions of dollars per annum; and every year, as the use of the invention is extended, these benefits will be augmented.

In the face of these undeniable facts, which are presented in the Commissioner's report, he dismisses the petition of Carré and attempts to belittle the invention by pronouncing it merely a substitute for pumps, and merely an imitation of Faraday's tube. Faraday's glass tube experiment was made public in 1823, but remained inert and useless, so far as practical ice manufacture was concerned, for more than a generation. It was not until Carré, in 1859, produced the present invention that ice could be economically manufactured, and but for Carré it is probable that we should not now be in possession of this remarkable and invaluable process. The Commissioner's conclusion is narrow-minded and erroneous. A device which is merely a substitute for another, is only capable of the functions of the original. Carré's invention was far more than a mere substitute. It eliminated from ice machines all the difficulties that had attended their operation. It rendered them effective, economical, and commercially practical, when before they were expensive, leaky, and well nigh useless. The tube of Faraday was a brilliant experiment, illustrating a novel principle. But, commercially speaking, it was not an ice machine. It required more than thirty years of time and the inventive genius of a Carré to give the principle practical embodiment, or harness it into duty for creating ice.

The action of the Commissioner of Patents in decrying the merit of Carré's discovery we regard as a disgrace to the country; and we trust that the next Congress will make prompt amends by reversing the Patent Office decision.

PENS AND THEIR FAILINGS.

It is a noteworthy fact that the man who made more steel pens than any other, and better ones,—the late Joseph Gillott—never wrote with a steel pen. With all the men and machinery at his command he was never able to produce a pen that suited him so well as the time-honored plume of the old gray goose. Mr. Gillott was not alone in his preference for the inconvenient yet easy quill. The kindly firmness of its bearing and its easy movement have never been approached by any of its metallic imitations. The iridium pointed gold pen, properly ground, comes nearest to the writing quality of the quill, and greatly excels it in durability; but gold pens are never properly ground by the makers. Steel pens, though excellent for pen drawing, are altogether too hard, scratchy, and tiresome for rough and ready writing, their persistent use resulting in that painful exhaustion of the nerves and muscles of the hand and arm known as writers' cramp—a malady due not so much to the necessary labor involved in tracing the letters as to the unnecessary and exasperating effort constantly called for in forcing the pen to go the way it goes hardest, and in keeping it from swerving right and left into easier paths: a malady, it may be added, which dates its origin from the introduction of steel pens, and which is demonstrably not caused by the chemical action of the ink and the resulting electric currents, or anything else save the vicious action of the pen itself.

To return to the goose feather is impossible. The supply is inadequate to meet the great and increasing demands of modern writing. For much of this literary and commercial labor, the writing machine in some form or other will be required; but there will still remain an immense amount of irregular writing which must be done by hand with metal pens; and it is time the penmakers began to furnish something approaching the good qualities of the quill. Only the blinding effect of tradition and training can account for the failure of penmakers to discover and correct the radical and plainly apparent faults of their productions. Take for illustration, the most common and mischievous of pen defects, faulty pointing.

One of the first principles of mechanical construction is that the bearing surface of any sliding tool or structure should be such that the line of least resistance shall lie in the direction in which you wish it to go. Skate irons, sled runners, and a thousand other illustrations will occur to the reader. The principle is too plain and self-asserting to be overlooked by the dullest, save in the matter of penmaking. In pens, however, the line of least resistance, if there be any, is sure to lie in any direction rather than that of the general stroke. The only effort made to lessen the resistance shows itself in giving a round point to the pen, a device most commonly adapted by gold pen makers. This is better than nothing; still it is faulty, in that it compels the user to constant exertion in keeping the stroke from wavering; and at the same time it reduces the bearing surface of the pen to the minimum, thus increasing friction and making fineness coincident with scratchiness. It is like setting an ice boat on round knobs, instead of on long and narrow runners.

To give a fine stroke easily and smoothly, a pen should rest not on a point but on an edge several times longer than it is thick, its length lying in the direction of the up stroke. By this means, the bearing surface of the pen is increased many times, and the smoothness of the writing in proportion. And as the least resistance is met in the line of the up stroke the writing will have a regular slant without any effort on the part of the writer to steady his hand. The down strokes lying at a slightly greater angle to the line of writing will, of necessity, be a trifle broader, giving distinctness to the letters, likewise without change of pressure or other effort. Sharpen a lead pencil, making one end flat and the other to a round point; then compare the writing of the two, for illustration of the position here taken.

A wrist all but crippled by the use of pens of ordinary make has compelled the writer to make a critical study of pen points, experimental as well as theoretical, for his own relief. Through the destruction of innumerable pens,—as the surgeon spoiled his "hatful" of eyes—the following process has been developed for converting an ordinary stiff, scratchy, tiresome pen into one that will glide over the paper as kindly as a quill. It is comparatively easy to give a quill point to a steel pen; but it soon wears sharp and requires frequent retouching on a fine stone to keep it in condition. A well tempered gold pen is better. Choosing one with a large point—a Mabie, Todd & Co.'s "Broad Point" is the easiest to improve,— carefully grind the back bevel-wise until the "point" presents a long sharp edge, like that of a narrow chisel, slightly oblique to the line of the slit. This done, rub the writing edge lightly on a fine hard stone, holding the pen as in ordinary writing. This will give a bearing surface as above described. The outer and inner corners of the edge and those at the slit will require a few light touches to round them slightly. Any roughness due to the coarseness of the stone may be removed by delicate rubbing on a finer stone or on hard paper. If the pen lacks the soft quick spring of a good quill, grind or scrape away as much gold from close to the point as may be required to bring it to the desired flexibility. A pen so improved will have all the good qualities of a quill, so far as attainable with a metal so slow tempered as gold. It is impossible that, by the use of some more elastic non-corrosive alloy like American Sterling, a perfect quill action could be attained, together with durability. What penmaker will try it, and bless mankind while making a fortune for himself?

DEODORIZING THE OFFAL FROM SLAUGHTER HOUSES.

We publish, on another page, an illustrated description of an invention and process for treating the offal from slaughter and rendering houses, and converting it into a fertilizer. This subject is most important from a sanitary as well as from an economical point of view; and this new system is probably destined to come very largely into use. In Chicago, the health authorities have suppressed the use of all other apparatus for this purpose, on the ground that the hygienic necessities of the case were not complied with, leaving the Storer method master of the field.

SCIENTIFIC AND PRACTICAL INFORMATION.

SILICA LENSES.

In a new work entitled *Telescope and Microscope*, recently published in France, the following method of obtaining a lens for a cheap microscope is ascribed to an experiment of Sir Humphrey Davy. The process consists in igniting one end of a wheat or hay straw and allowing the entire spear to consume gradually. The cinder is then heated in the blue flame of a burner; and from the silex contained, a solid globule of glass is formed, said to be well suited for microscopic purposes.

MUSHET STEEL.

Professor Heeren has analyzed this remarkable metal and finds that, excluding carbon and perhaps traces of other substances, it contains 8·3 per cent of tungsten and 1·73 per cent of manganese. Untempered, this steel resists the file; but after tempering, it becomes much softer and readily yields.

AMMONIA IN PNEUMATIC TUBES.

MM. Tommasi and Michel have suggested the substitution of ammoniacal gas for air, in propelling dispatches through the tubes of pneumatic systems. First combined with water, the gas disengaged by heat enters the orifice of the tube and, being under sufficient pressure, drives the dispatch boxes through before it. On reaching the exit opening, it re-condenses, forming a vacuum in the pipe through which the boxes may be returned by atmospheric pressure. The apparatus is said to require very little fuel or gas.

METHYL GREEN.

In preparing substitution products of rosaniline (fuchsin) with the alcohol radicals, instead of causing the iodine compound to act upon a salt of rosaniline, it is now customary to produce them directly by the oxidation of methyl-aniline. In this way a compound is obtained, which is chemically identical with the so-called iodine violet, but which is prepared without the use of iodine. It is known in the trade as methyl-violet, to indicate the method of its preparation. It is distinguished by its losing none of its brilliancy by artificial light. This preparation of methyl-violet could not fail to influence the manufacture of iodine green. A means was sought for causing the methyl violet to take up the radical methyl so as to form the green methylated methyl rosaniline. In this case the use of iodide of methyl was not absolutely necessary; and in many manufactories in South Germany, the chlorine compound is used, which produces a green, crystalizing in beautiful crystals, while the iodine green is an amorphous powder; the chlorine green is also more soluble in water than the iodine. Not being obtained as a by-product in making violet, there is no foreign dye adhering to it, and a fresh dye bath gives as soft a green as one that has been used, which is not the case with iodine green, a fact generally known. Hence the so-called methyl green has two important advantages over that prepared with iodide of methyl.

First, it is more permanent than iodine green, and the solution may be boiled without decomposition. Secondly, wool is dyed with methyl green alone, it not being necessary, as formerly, to neutralize with ammonia and afterwards brighten with acid. In dyeing different shades, this is of great importance. The extensive use of iodine in the manufacture of aniline colors for the last nine years has caused a fourfold increase in its price, and was continually becoming more expensive, so that it is important to be able to dispense with it altogether.