CORKS AND CORK CUTTING.

The cork tree is a native of Spain and Portugal, being found in the latter country in large numbers in the vicinity of Lisbon. A recent visit to that capital afforded us an opportunity to inspect the method of obtaining this useful material directly from the trees, and a stroll through some of the cork cutting establishments in this city enables us to trace the progress of the bark from the time it is removed from the forest to its final entry into our American market.

Cork is the soft cellular interior bark found in a peculiar variety of the oak (*quercus suber*). It lies inside of the exterior woody covering, growing from year to year as the diameter of the tree increases. During the first fifteen or twenty years of its existence, the cork contains considerable wood, which impairs its elasticity and renders it unfit for use, so that until the tree has attained the above mentioned age, the material is not fit for the market. After that period, the cork begins to die. Its growth ceases, and the trunk, continuing to increase in diameter, splits it off in layers which are removed every eight or ten years, the quality of the material improving by age. The tree does not suffer from the process, as it generally lives from one to two hundred years.

The cork is removed by first making several longitudinal clefts up and down the trunk, and then girdling the latter by horizontal incisions. The bark is pounded, detaching it from the tree, so that afterwards it is easily removed by the wedge-shaped handle of the axe used for cutting. This labor is done almost entirely by a peculiar tribe of nondescript beings, either Indians or gypsies who, originally inhabiting the mountainous regions in the north of Portugal, seem at present to have abandoned their wild life, as they perform most of the menial work of the country.

The layers of bark as they are removed are first soaked in water and then blackened over a coal fire, the object of this proceeding being to make the surface smooth and at the same time to conceal any flaws in the shape of knots or cracks which may be visible thereon. They are then pressed and finally packed on lighters, for transportation down the Tagus river to the warehouses of Lisbon. These lighters are vessels of peculiar shape, as they are of very broad beam though having a sharp bow.

Thwartships the boat, poles are placed quite close together, on which the layers of cork are heaped to a hight of fifteen or twenty feet, often loading down the lighter until the water reaches her gunwale. The means of propulsion is a three cornered sail, and the crew consists usually of three men, dressed in a highly picturesque costume, who contrive by the aid of long oars to manage their craft, in spite of the strong tide which often renders navigation a matter of difficulty.

After being received at the warehouses, the large sheets are cut into pieces of about three and a half feet in length, eighteen inches in width, and ranging from one half inch to three inches in thickness. Drying and packing in bales weighing one hundred and fifty pounds each follows, and the cork is ready for exportation.

We next find it in the hands of the cork cutter in this country, who pays from five to twenty-five cents a pound for the rough material in the bale. As the latter is unpacked, the slabs are inspected and assorted according to their sizes and quality, those of the finest texture being of the greatest value. They are then placed in a steam chest and steamed, by which process the material is softened and rendered easy to cut. A vertical revolving circular knife, operated by steam power in the same manner as an ordinary circular saw, now divides the sheets into narrow lengths and again cuts them into small squares—the dimensions of the latter being governed by the size of the corks into which they are to be made. It is well known, that, in order to cut cork, a drawing motion must be given to the knife. Crushing strokes simply break off small pieces, and attempts to whittle the substance will show still more plainly that the knife edge must be drawn lengthwise and not forced downward. It is on this principle that cork cutting machines are constructed. Steel mandrels, made hollow, with cutting edges like those of a shoemaker's punch, are made to revolve with great rapidity. Pieces of cork pressed against their cutting edges become almost immediately smooth perfect cylinders. These are placed in grooves on the circumference of a wheel which, working automatically, carries each cork to a point where its ends are received by a small lathe. The cork is then revolved slowly, while a large circular knife removes a thin shaving, thus giving it the necessary taper and a surface as true and smooth as if sand-papered. As fast as a cork is finished by the automatic lathe, it is released and another substituted in its place.

Some manufactories do not make use of the mandrel and automatic lathe as above described, but employ another form of machine which is much simpler in arrangement though less efficacious in action. It consists of a horizontal revolving knife of some two feet in diameter arranged on a frame with belting, etc. The workman, sitting in front of the machine, places one of the square bits of cork, which have been previously cut of the required size, into a revolving spindle by which it is firmly held. This spindle is raised a measured distance and the edges of the cork come in contact with the revolving knife, which pares them off, leaving the cork in a perfectly cylindrical form.

The operation is performed with great rapidity, the machine turning out some fifty gross per day. The size of the cork depends upon the distance the above mentioned spindle is raised, and the consequent quantity of the square piece which the revolving knife is permitted to remove. All sizes can be made on this machine, from the tiny stopper of the homœopathic vial, scarcely one quarter of an inch in diameter, to the four or five inch flat cork used to close jars of chemicals, etc.

The shavings made by these machines are all utilized—either as stuffing for cushions or life preservers, linings for refrigerators—cork being an excellent non-conductor of heat or cold—or for placing between floors or walls of buildings to deaden sound. Ground finely and mixed with india rubber, they also make a durable floor covering, resembling oil cloth.

The finished corks are sold by the gross, the present prices being 10 cents for the smaller vial sizes, $3 to $5 for the fine qualities used for closing champagne bottles, and from $10 to $12 for the extra large varieties. The use of machinery for this industry, introduced in this country in 1853, has proved a great saving of hand labor. It has been estimated that it would require 4,000 men to be continually at work to supply New York alone with corks, if all had to be made by hand. There are at present 60 manufactories in the country, cutting and supplying corks to the value of $2,250,000 yearly.

THE NEW RAILROAD BRIDGE AT ALBANY.

The largest double track iron bridge ever built in this country has recently been completed, and now spans the Hudson river between East Albany and Albany. The work was commenced on May 24th, 1870, and the first stone of the substructure was laid on the succeeding June 25th.

The main bridge is 1,525 feet long, and consists of seven spans over the basin, thirteen feet three inches each from center to center of piers; four fixed spans over the main channel, 185 feet each, and a draw 274 feet long, with two openings of 111 feet each in the clear. The curve of the bridge over the basin is on a radius of 710 feet. The main bridge is thirty feet above low water, and eight feet above high water mark, and is constructed on a vertical curve having a rise in the middle of fifteen inches. The whole length of the bridge, together with its approaches, including an embankment crossing Van Rensselaer island, on the east side of the river, is 2,250 feet, thus being equal to 4,500 feet of single track bridge. The abutments and piers are built on pile foundations, 160,000 yards of stone being used in their construction. The draw weighs 700,000 pounds and can be worked either by steam or by hand, the engine and boiler of ten horse power being located beneath the road way.

The superstructure consists of 2,000 tuns of iron, mostly wrought, its trusses being twenty-six feet apart in the clear. The tension bars are made of double refined iron, and the fabric is calculated to stand a load of 6,000 pounds per lineal foot, exclusive of its own weight. The strain to which the bridge would be subjected under this load would not exceed one sixth of the breaking weight. It is estimated that the structure would sustain a continuous train of locomotives on each track, reaching from end to end of the bridge.

The entire cost of the structure was one million dollars. It is at present used for the crossing of freight trains and also for foot passengers, pathways on either side of the tracks being provided. The regular trains of the Hudson River road will not discontinue crossing the old bridge until the new depot in Albany, which has just been begun, is completed.

Messrs Bagley and Hilt, both well known bridge builders were entrusted with the supervision of the work, and Mr. Charles Hilton of Albany was engineer-in-chief.

Hints on Coloring Photographs.

The increasing demand for colored photographs, either as *cartes de visite*, stereoscopic enlargements, or slides for the magic lantern, opens a suitable field of labor for the educated of either sex: in fact, they are the only fit persons to undertake it, as it requires a lightness of touch not generally possessed by those accustomed to labor. But none can hope to succeed without some degree of talent, and who have had a sufficient practice in the use of colors to enable them to paint a tolerable picture without a copy, not a vile travesty of some chromo-lithograph, which is often the only practice afforded to school pupils. No particular box of colors, however prepared, will bridge over the want of experience.

Should any wish to follow this branch of art, let them color a prepared photograph to the best of their ability, and then show it to some respectable publisher, who will, no doubt, give an honest opinion on its merits; and should this be adverse, unless the time and expense of further practice can be conveniently spared, it would be better to lay aside the idea, otherwise time might be wasted, during which opportunities might be lost that might never again be offered.

The greasiness of the surface of albumenized paper offers some obstacle to the uninitiated, but this is easily overcome by adding a little prepared ox gall to the colors used, or even by passing the tongue over the surface. The greatest drawback I have found has been the difficulty of obtaining purity of tints in the half shades and reflections of the flesh, owing to the muddy brown color to which the print has been toned, a sort of smudge, which no transparent color can remedy. This, and the tendency of silver prints to become yellow by age, has often caused me to consider whether it might not be better, when they are especially prepared for coloring, to use some other process which would give more favorable tint for working upon. As I believe any variety of tint can be given in carbon printing, this, with its permanence, would point it out as the most preferable, but would, probably greatly increase the expense of a single copy only.

When oil colors are to be used, two or three coatings of weak size, made of gelatin, should be given to the print beforehand, and allowed to dry. As in water, transparent colors can be used, and the effect much improved by touching the high lights with opaque ones.

In portraiture, should the painter be sufficiently master of his art to paint a good picture in the usual way, he will find it much better to use the photograph as a copy than as a substratum.

Transparencies on glass must always receive a weak coat of varnish before coloring, otherwise dabbing in the skies will do injury to the impression.

It should be understood that there is a great difference between coloring—that is tinting—a photographic print and painting upon one; the former requires little more than tasty manipulation, the latter the skill of a well trained artist.

Retouching negatives also offers suitable employment, especially for female artists, as it requires light and delicate handling. I should think that an artist capable of retouching from the life—that is, taking sittings from customers—would be considered a desideratum in many photographic establishments, and be liberally remunerated.—*Photographic News.*

How the California Fields are Plowed.

The fields are plowed with what are called gang plows, which are simply four, six or eight plow shares fastened to a stout frame of wood. On the lighter soil, eight horses draw a seven gang plow, and one such team is counted on to put in 640 acres of wheat in the sowing season; or from eight to ten acres per day. Captain Gray, near Merced, has put in this season 4,000 acres with five such teams—his own land and his own teams. A seed sower is fastened in front of the plow. It scatters the seed, the plows cover it—and the work is done. The plow has no handles, and the plowman is, in fact, only a driver; he guides the team; the plows do their own work. It is easy work, and a smart boy, if his legs are equal to the walk, is as good a plow man as anybody—for the team turns the corners, and the plow is not handled at all. It is a striking sight to see ten eight horse teams following each other, over a vast plain, cutting "lands" a mile long, and when all have passed, leaving a track, forty feet wide, of plowed ground. On the heavier soil, the process is somewhat different. An eight horse team moves a four gang plow, and gets over about six acres per day. The seed is then sown by a machine which scatters it forty feet, and sows from seventy-five to one hundred acres in a day, and the ground is then harrowed and cross harrowed. When the farmer in this valley has done his winter sowing, he turns his teams and men into other ground, which he is to summer fallow. This he can do from the first of March to the middle of May; and by it he secures a remunerative crop for the following year, even if the season is dry. This discovery is of inestimable importance to the farmers on the drier parts of these great plains. Experience has now demonstrated conclusively that, if they plow their land in the spring, let it lie until the winter rains come on, then sow their wheat and harrow it in, they are sure of a crop; and the summer will have killed every weed beside.

How Summer Suits should be Washed.

Summer suits are nearly all made of white or buff linen, pique, cambric, or muslin, and the art of preserving the new appearance after washing is a matter of the greatest importance. Common washerwomen spoil everything with soda, and nothing is more frequent than to see the delicate tints of lawns and percales turned into dark blotches and muddy streaks by the ignorance and vandalism of a laundress. It is worth while for ladies to pay attention to this, and insist upon having their summer dresses washed according to the directions which they should be prepared to give their laundresses themselves. In the first place, the water should be tepid, the soap should not be allowed to touch the fabric; it should be washed and rinsed quick, turned upon the wrong side, and hung in the shade to dry, and when starched (in thin boiled but not boiling starch) should be folded in sheets or towels, and ironed upon the wrong side as soon as possible. But linen should be washed in water in which hay or a quart bag of bran has been boiled. This last will be found to answer for starch as well, and is excellent for print dresses of all kinds, but a handful of salt is very useful also to set the colors of light cambrics and dotted lawns: and a little ox gall will not only set but brighten yellow and purple tints, and has a good effect upon green.

Boiler Explosions.

Our esteemed correspondent, John Wise, of Philadelphia, Pa., in the course of a letter on this subject, makes the following communication:

"Why not make boilers egg-shaped? At all events, make them strong enough, as are made the big guns of warfare, so that they may bear, not double or treble their nominally guaranteed pressure, but strong enough, like Perkins', to bear a red heat, and then we shall no longer call for daily coroners' juries to inquest the steam boiler slain.

"It is seldom we hear of a steam chambered fire box explosion. And why? Because they are well braced and staybolted. Brace and staybolt the boiler, with equal precaution as to form and material as to its work and incidents, and then, and not until then, will explosions of steam boilers become rare."

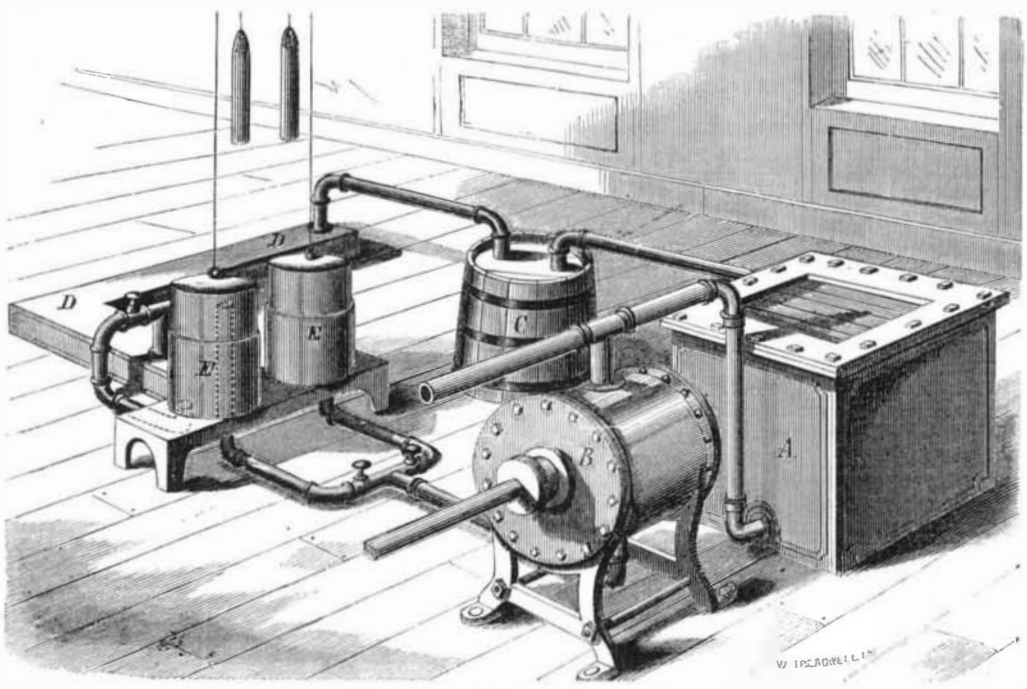
AN exchange says: "Cleveland has invented a patent bug buster, worked with an air pump. All the apertures in a room are stopped but one, at which the deadly bug buster is placed. By exhausting the receiver, a current of air is produced strong enough to draw all the vermin out of the room, through the air pump, into the hopper, where they are put under the influence of chloroform, and stabbed in the back with a pitchfork."

WE regret to hear of the death of Dr. Perry Prettyman who was one of the pioneers of civilization in Oregon territory. He migrated thither in 1847, and continued to reside there till the day of his death, March 27, ult. His age was 76, and his life has been made useful to his country by many inventions and improvements.

Improved Ice Machine.

The invention we illustrate consists of improvements in the method of, and machinery for, making ice by artificial means. At A is shown a tank, which is constructed of an outer chamber in which the freezing material is placed, and of an inner chamber to contain the water to be frozen. B is an air pump connected by a pipe with the freezing chamber in the tank; C is a vessel filled with oil or other hydrocarbon, into which the air from the freezing chamber is conveyed by a pipe from the upper part of the tank; D is a second oil vessel, which is connected by a pipe with the first; E E are two vessels having weighted covers; they are connected by pipes with the oil vessel, D, and also with the air pump, B, as shown in the engraving.

The freezing substance considered preferable is bisulphide of carbon, although ether, rhigoline, or chloroform, may be employed. The operation is as follows: The air is forced by the pump, B, into the freezing chamber in the tank, A. There it passes through the bisulphide of carbon and becomes surcharged with it, abstracting the requisite addition of heat from the water chamber. The heat and vapor of the bisulphide are then carried, with the air, into the oil vessels, C and D, where they are eliminated and the air purified. The purified air is thence conveyed to the vessels, E E, from which it is returned to the air pump by weighting their covers after closing the inlet cocks. The oil, when it has absorbed as much heat and bisulphide as is expedient, is drawn off and distilled, and the agent employed is re-obtained in its original quantity and purity. By the means described, the air is quite, or very nearly, restored to its original purity and temperature before it is carried back into the freezing liquid, and difficulties attending the use of other similar apparatus are thereby overcome. A further improvement in the process consists in depriving the air current of the aqueous vapor with which it is always more or less charged, and which forms frost and ice in the pipes; this is accomplished by passing the air over chloride of calcium placed in the bottom of the pipe leading from the pump to the freezing chamber. The invention was patented through the Scientific American Patent Agency by W. R. Johnston and W. Whitelaw, April 30, 1872. For further information, address the Whitelaw Ice Machine Company, Memphis, Tenn.

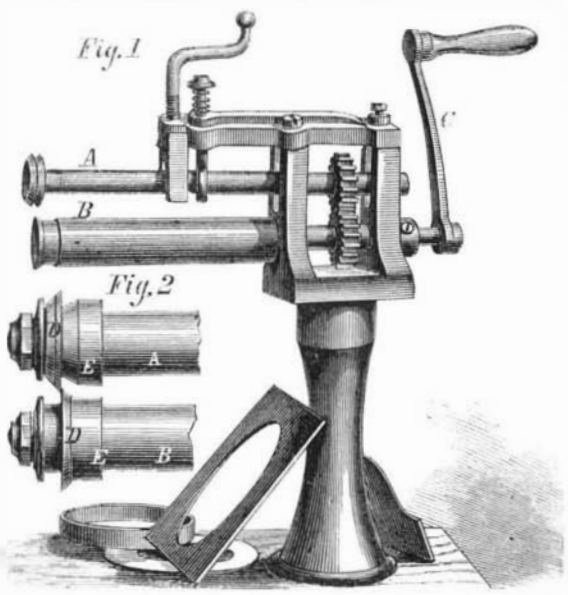


MACHINE FOR MAKING ICE.

BUNKER'S METAL CUTTER.

Our engraving illustrates a new machine for cutting metal with rotary knives, which is appropriate for tinners' use, and also for cutting iron that is too heavy for ordinary bench shears to act upon.

Fig. 1 shows the general arrangement, in which A and B



are two shafts which carry the cutters. The top one, A, is adjustable, by means of screws, to any required distance from the lower one. The two are geared together, as shown in the engraving, and turned by the handle, C. Fig. 2 shows enlarged views of the cutting and feeding apparatus attached to the ends of the shafts. The circular cutters, D D, overlap each other, so as to cut shear-fashion. Behind the cutters are rings or cylinders, E E, which press upon, and serve to feed, the metal to the cutters. The operation will be fully understood without further explanation. It is thought this machine will prove very useful for cutting off stovepipe, and for cutting out the holes for doors in stoves and furnaces. Several of the forms cut by it are shown at the foot of Fig. 1. Patented through the Scientific American Patent Agency, April 30, 1872. Further information can be obtained of the inventor, Mr. A. S. Bunker, 288 Common street, Lawrence, Mass.

Trial of Agricultural Implements.

The Ohio State Board of Agriculture have appointed a trial of agricultural implements and machines, to take place at Springfield, June 18, 1872. The following is a list of classes designated for competition, with the premium for the best of each description: Plow for general purposes, stubble plow, sod plow, double plow; premium in each case, a silver medal or $20. Subsoil plow, hill side plow, one horse plow, double shovel plow, a premium for each of a silver medal or $10. Steam plow, practical utility of operation to be fully demonstrated, $50; improvements in plows, diploma. Two horse grain drill, $40 and diploma; one horse grain drill, $10 and diploma; garden seed drill, $5; horse power corn planter, $20 and diploma; potato planter, $5; potato digger, $10; two horse corn cultivator, $20 and diploma; one horse corn cultivator, $10 and diploma; farm road scraper, $10; roller and crusher, $15; harrow, $10; mole or blind ditching machine, $20; post hole borer or digger, $5. In giving premiums on plows, the following points will be considered: Gross draft, weight, loss of power in overcoming friction, net power required to cut and turn the furrow slice, width of furrow slice, depth of furrow slice, comparative draft, simplicity of structure, materials, workmanship, durability, price, superiority of work. Competition is invited from all parts of the Union.

DURAND'S BURETTE.

This little appliance is the invention of M. Durand, of Saint Ouen, department of the Seine, France. Its operation will be readily understood on reference to the annexed illustration, in which a is the body of the can, b the long curved spout, and c c_1 a small tube in the form of a segment of a helical coil. This coil is affixed to the cover of the can and has one end, c, open to the air, and the other c_1, open to the inside of the can. In using the oil can when full of oil, all that is necessary is to cover the external aperture, c, with the thumb, which prevents any flow of oil from the spout, which is sufficiently small in diameter to prevent contrary currents. When it is desired to supply any lubricating reservoir, it suffices to uncover the aperture c, and thereupon the oil will flow in a small stream from the spout until the atmospheric pressure is again cut off from the interior of the oil can, after which no single drop will escape. This oil can is ingeniously simple and effective, and has been reported upon most favorably by a committee of the French Academy on Mechanical Arts.

Sea Weeds a Thousand Feet Long.

The Agassiz expedition, at the latest accounts, was off Sandy Point, Patagonia. Among the scientific curiosities noted by some members of the party were immense quantities of kelp, the *Macrocystis pyrifera*. This is the largest known *alga* or seaweed, and grows on these coasts in from six to twenty fathoms of water, in vast beds, warning the mariner to beware a near approach, unless he wishes to be entangled in an inextricable net work. It throws up from the oceanic depths stems of immense lengths, some of them from seven hundred to one thousand feet, the greatest development reached by any member of the vegetable race now in existence. Patches of this seaweed were passed in open sea, with large sea lions lying on its surface, who were apparently navigating in this novel manner with much satisfaction to themselves, and who afforded much amusement to their scientific observers.

False References.

A firm, hailing from Mississippi and purporting to be engaged in the business of selling patents under the style of Z. P. Dedrick & Co., are making unauthorized use of the name of Munn & Co. as a reference for their responsibility. Patentees will do well to keep clear of parties sailing under false colors.

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A Simple Plan of Polishing Photographs.

Certainly a great number of my colleagues who have essayed the collodion and gelatin process for finishing photographs have met with many difficulties and uncertainties inherent to the method, and have, consequently, thrown it up; it was so with myself, and I went back again to an older plan of enamelling, which I had previously employed.

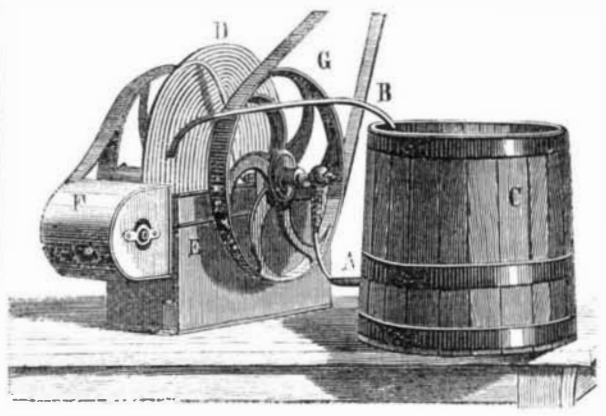
In the year 1865, I met with a photograph which had emanated from the studio of M. Dauthendey, of Wazburg, the picture being a bust with white oval margin upon a black ground. The photograph possessed a magnificent polish, and was of a very brilliant character; and experiments that I made with paper varnishes, etc., were all fruitless in giving the degree of finish possessed by the Dauthendey picture. Finally I came upon the following plan: I mounted about a dozen carte prints upon a card, covered them with a solution of gum—or, better still, gelatin—and when they had dried and been rolled and retouched, they were polished with a solution of white shellac in spirits of wine. This operation was conducted as if it was a question of furniture polishing, a rag being moistened with the liquid and rubbed to and fro over the prints for some time. The pictures, after standing the night, were again subjected to a second polishing.

Whenever the rag exhibited a tendency to stick to the surface, a minute quantity (say half a drop) of almond oil was applied to the photograph, and the operation of polishing continued. The photographs are subsequently cut out of the card. It is better to polish a number of small photographs at one time like this, as a large surface is more easily operated upon than a smaller one. The process is, probably, the same as that of M. Dauthendey, to be purchased for a honorarium of four florins.

The method, as already stated, is much to be preferred to the collodion and gelatin enameling process, so often recommended.—*C. Hoffman.*

DYNAMIC REFRIGERATOR.

Mr. J. B. Toselli, of Paris, France, has invented a cooling machine, which he calls the "Dynamic Refrigerator." It consists of a revolving disk, D, formed of a metallic tube bent into a complete spiral, having one end open, and with the other end communicating by a hollow shaft or axis of rotation with an external tube, A, communicating with a worm contained in a separate vessel, C, and terminating in a discharge pipe, B, with outlet into another vessel, E, containing the revolving disk, to which a slow movement of revolution is imparted by a driving pulley and belt, G, making, say, one turn in a second of time. The disk is half immersed in cold water, and as the exterior surface of the disk above water is continually wet, it exposes considerable evaporating surface. At the same time a continuous stream of water is forced through the hollow spiral, parting with some of its heat under the influence of the external evaporation and radiation, which is intensified by the addition of a ventilator, F.



The current being thus lowered in temperature, refrigerates in its turn the liquid to be cooled in the vessel, C. The lowering of temperature thus obtained varies according to the hygrometric condition of the atmosphere; the minimum effect obtained, under the most unfavorable circumstance, amounts only to a difference of 5° to 6° Fah., while the maximum difference obtained in sunlight is between 32° and 33° Fah.

This machine is obviously calculated to be of great service in many manufacturing processes—such as for brewing, distilling, and effervescent beverages—also in hydrotherapeutic establishments; and probably also on shipboard for the evaporation and distillation of sea water, and its conversion into a potable fluid.—*Mechanics' Magazine.*

ACOUSTIC EXPERIMENT.—Let a wide glass tube, open at both ends, be taken, and in this a piece of fine wire gauze be pushed up some little distance. If the gauze be now heated to redness, over an ordinary Bunsen burner, and then removed, it will shortly emit a shrill note, lasting from five to ten seconds. The experiment will be new to most of our readers, and has the merit of always going off.—*Journal of the Franklin Institute.*