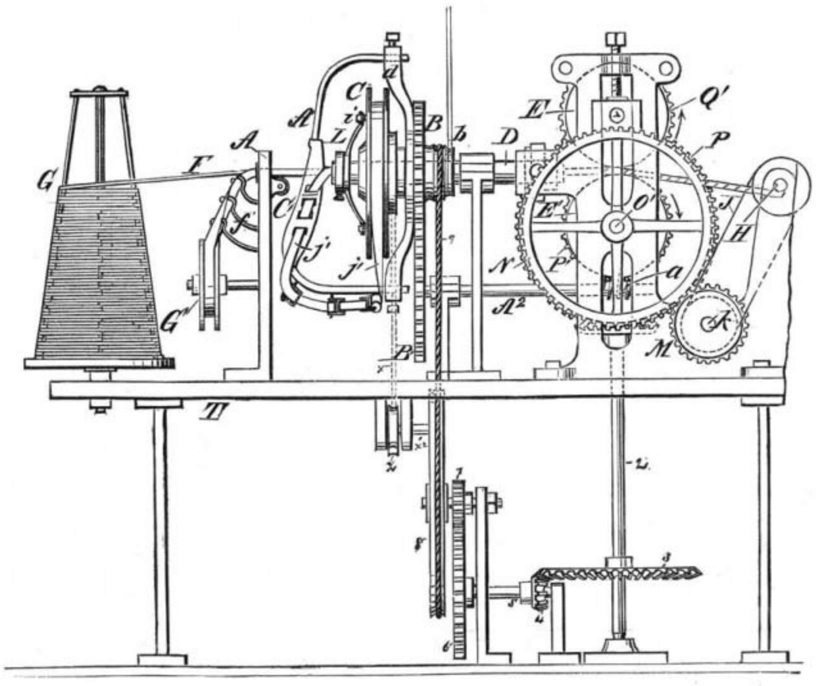
WIRE WRAPPING OR COVERING MACHINE.

The accompanying drawing shows a side elevation of a wire covering machine, recently patented by Mr. Charles Conner, of Ashtabula, O. The reel, C, on which the ribbon, *j*′, is wound, is journaled loosely upon the sleeve, D, upon which is also journaled the cog wheel, B, upon one side of which is formed the cone pulley, *b*, and upon the other side the radial arms, *d*, in the outer ends of which is held the bent rod, A′, to which are attached the ribbon tension plate, C′, the guide plates, and friction rollers. The cog wheel, B, meshes with the cog wheel, B′, arranged upon the shaft, A^2. Keyed upon this shaft is a worm that meshes with a cog wheel upon one end of the shaft, O′. The beveled cog wheel, P, is normally keyed to the shaft, but may be easily loosened. The cog wheel, P′, meshes with the wheel, Q′, and upon the other end of the shaft, O′, is the large cog wheel, N, which meshes with the cog wheel, M, on the shaft, K, that communicates motion through the belt, J, to the winding drum, H, so that when the wheel, P, is unkeyed from its shaft, and power is applied to the cone pulley, *b*, and wheel, B, revolved, the rubber drawing rollers, E E′, and drum, H, will be revolved through the system of gearing just described, for drawing the wire, F, from the reel, G, through the sleeve and winding it upon the drum. When the wheel, B, is revolved, the bent rod, A′, will be carried rapidly around the wire and reel, C, so that the ribbon, *j*′, passing from the reel through the guide plates and slots in the tension plates, to the wire, will be spirally wrapped upon the wire in front of the sleeve. Placed loosely upon the sleeve, D, is a tension device for the reel, C. The ends of the bow shaped piece, L, are provided with small rubber rollers, *i*, which bear against the side of the reel and can be adapted to exert a greater or less pressure by means of an adjustable collar placed upon the sleeve. In front of the eye plate, A, is the reel, G′, which carries the ribbon that is first to be folded around the wire.

When the cog wheel, P, is unkeyed and the machine operated by power applied directly to the pulley, *b*, the gearing beneath the table remains idle. When this mechanism is to be used, the worm, *a*, is removed from contact with the wheel, P′, which is firmly keyed to its shaft. Power is then transmitted by the wheels, M and N, to the beveled wheel, P, which meshes with the beveled wheel on shaft 2. Power is then transmitted as clearly shown to the cord, 9, which passes over the pulley, *b*. The shaft, X^2, is mounted in hangers beneath the table, and carries the pulley, X, and a friction wheel bearing against the wheel, 8. A cord leading from this pulley to a pulley on the side of the reel revolves the latter when ribbon is to be wound upon it.



CONNER'S WIRE WRAPPING AND COVERING MACHINE.

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What Makes Ice White and Opaque.

It is a law of light that in passing from one substance to another possessing a different power of refraction a portion of it is always reflected. Hence when light falls upon a transparent solid mixed with air, at each passage of the light from the air to the solid and from the solid to the air a portion of it is reflected; and in the case of a powder this reflection occurs so frequently that the passage of the light is practically cut off. Thus, from the mixture of two perfectly transparent substances we obtain an opaque one; from the intimate mixture of air and water we obtain foam; clouds and snow owe their opacity to the same principle; as also does the whiteness of crushed diamonds, salt, glass, and many other substances which are transparent before the pressure is applied to them. Ice being, therefore, opaque and white in proportion to the amount of air it contains at the time of crystallization, it follows as a matter of course that anything which tends to expel it from the water before it is frozen will contribute to its transparency when it assumes the solid state. If, for instance, water be boiled and kept from taking up air from the atmosphere while being cooled to 32 degrees, the result will be perfect transparency in the ice thus formed, whether the process of freezing be slow or rapid. The reason for this is that no air can exist in water in a boiling state. The same is true of perfectly filtered water similarly protected from the atmosphere. In case of ordinary water, which always contains a certain amount of fixed air, the ice made from it will depend for its color on the temperature under which it is frozen; and as this varies, neither ponds nor rivers produce ice of anything like uniformity in this respect. Every ice dealer is aware that river ice, as a rule, is clearer and brighter than that of ponds or lakes; the reason being that the current in the river aids the crystallizing force to expel the air, which in still water, especially in very cold weather, is caught up and embedded in the ice, thus affecting its color and, to a slight degree also, its density and durability. Against these advantages in favor of running streams we must put the larger yield in ponds, the lesser liability to damage from sewage, storms, and freshets, and, though last not least, the increased quantity of oxygen and carbonic acid which make ice on ponds both more palatable and digestible than that of running streams.

It will thus be inferred that the only real advantage in favor of river ice is its greater transparency when produced in very cold weather, and that if some feasible and cheap method of eliminating the air from pond ice can be invented and applied, the only popular objection to it would be removed, and ice as bright and transparent as that of the Kennebec or Penobscot rivers could be obtained from a multitude of home sources, and the cost of harvesting, transportation, and waste would be greatly reduced. While fully conscious of the difficulties to be encountered by those now engaged in solving this problem, we have never entertained any doubt of its ultimate accomplishment, and that at no distant day, and its success will undoubtedly prove a rich mine of wealth to the inventor. The whiteness and opacity of ice being unquestionably due to the presence of air cells, it is simply a question whether the required motion can be artificially created in ponds without impeding the process of solidifying, and at a cost which will not materially affect the first cost of production. This is the whole thing in a nutshell.

In estimating the value of such an invention to the ice trade, it must not be lost sight of that the quantity as well as the quality of pond ice would be thus improved, for it is equally well known that water from which the air has been expelled, whether from boiling, filtering, thawing, or any other process, will freeze faster under a given temperature than water largely impregnated with atmospheric air. This can be readily tested by filling two glass vessels, one with common hydrant or river water, and the other with water that has been boiled or filtered (but sealed in the interval from the outer atmosphere), and then subjected to a like freezing process. The latter specimen will be the first to solidify. The reason for this is that air in water tends to weaken the cohesion of its particles, and thus retards crystallization. As an illustration of this fact, M. Donny, a distinguished French scientist, has proved that if water be thoroughly purged of its air a long glass tube filled with this liquid may be inverted, while the tenacity with which the water clings to the tube, and with which its particles adhere to each other, is so great that it will remain securely suspended, though no external hinderance be offered to its descent. Owing to the same cause, water deprived of its air will not boil at 212 degrees Fah., and may be raised to a temperature of nearly 300 degrees without boiling, but when this occurs boiling is attended with an explosion.

We might extend this discussion to an almost unlimited extent, but we have already said sufficient to show that the efforts now being made to increase the quantity of pond ice and improve its quality possess an importance to the ice industry which can hardly be exaggerated, while they are full of promise as to their ultimate issue.—*Ice Trade Journal.*

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How to Destroy May Beetles.

A writer in *Vick's Magazine* relates his mode of destroying the May beetle, or June bug. He states that he has practiced his method for the past five or six years with the most satisfactory results.

"In the first place, I save all the trimmings of trees, bushes, and litter of every kind which will burn and make a good blaze. I keep it all until the period arrives at which the beetle commences to fly in the evening, as they are nocturnal insects. I then commence building bonfires in several places in the evening, and keep them going for two or three hours for several evenings, making as much blaze and light as possible. The flames and light attract the beetles by hundreds and thousands, and the result is they fly in them and are burned up. At the time I commenced this practice I used to find thousands of beetles in the spring when I worked my fruit patches, but this spring there has been only one beetle discovered which I have heard anything about, and I presume he must have been an immigrant. In company with the beetles there are thousands of moths and millers fly into the flames and are destroyed, all of which, I believe, prey upon vegetation."

Turning, Cutting, and Polishing Stone.*

Alabaster and marble can be turned with any ordinary metal cutting tool, or better, an old, worn out saw file; but great care is necessary when forming a moulding or bead not to spall the edges. The best plan is to work the tool from the corner in; when roughed near to size, begin by scraping with a flat-nosed tool, lightly, until complete; then get a piece of water Ayr stone, and go over the whole surface, keeping it well wet with clean water, until you have a good dull surface, and free from all scratches. Then, with an old linen or felt, made wet and sprinkled with putty powder, go over lightly, until you have whole surface polished.

Granite or onyx may be turned with a diamond, set as a turning tool, either by hand or in slide rest, to the shape wanted, and then ground to a surface with emery and a lap of zinc, and then with a second grit and with water Ayr, and polished the same way as before.

For cutting stone of hard nature get a disk of soft iron, about 6 inches or 8 inches in diameter and 0·01 inch thick, mounted as a circular saw, driven about 300 revolutions per minute, lubricated with water and a little soap occasionally on the sides of the disk; the disk to be charged on the edge with diamond dust, well embedded in, and care must be used in beginning the cut not to press too heavily until the disk has got a bite of the stone, or you will strip it of the dust. The piece to be cut is best cemented or fixed to a pivoted arm. I have cut specimens this way, $\frac{1}{32}$ inch thick and 2 inches diameter.

In cutting specimens for microscope slides it is better to cut them about $\frac{1}{16}$ inch thick and cement them to a piece of plate glass about 2 inches square, $\frac{1}{4}$ inch thick, with a little Canada balsam, using a gentle heat to help to evaporate; then when fixed they may be ground down to the required thickness by a lap made of thin zinc, nailed flat to a piece of wood, with fine emery and water, and a light rotary motion. Do not add fresh emery when the specimen is nearly transparent, but still work the same over until the scratches do not show. Then carefully clean the glass slip and cover ready for mounting. Apply heat to remove the specimen from the grinding slab, lifting it up when softened with the point of a needle, then place it for about a couple of minutes in a small drop of "turps," to remove the particles of emery in the grinding process. Then put a drop of Canada balsam in the center of the slip, hold it over a lamp, but do not let it boil, or it will produce air bubbles. When sufficiently hot lift the specimen with the point of a needle just tipped with balsam, so as to stick; carefully lay it on the hot slip gradually, so as to exclude the air. Then while hot put on the glass cover, and should there be any air bubbles, they can be drawn out by applying a hot needle to the cover, over the spot, and drawn toward the edge of cover, then the slide will be ready for test. Under the microscope some specimens require to be reduced to the 0·001 inch, to show their structure, while others show good at $\frac{1}{64}$ inch.

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Treatment of Burns and Scalds.

Dr. C. F. Naismith writes to the *Lancet* that he has secured most excellent results from the following method:

At first, he used the soda solution, followed by carron oil, but soon abandoned them as unsatisfactory. The former owes its reputation to the cold water, and not to any soothing property in the soda. His invariable practice, however extensive the scald, has been to place the injured member in ice cold water, keeping it there until all pain had disappeared—say in from two to four hours, or even longer. The water heats rapidly, and must be kept cold either by ice or constantly renewing. As long as the scalded part is kept under water (provided it is cold enough) no pain is complained of, and symptoms of shock are much lessened. When the limb will bear removal from the water without pain, he lays on thickly lead acetate and resin ointment (one drachm to one ounce) and envelops in cotton wadding. He has used this ointment also in erysipelas with the best results, all symptoms of inflammation rapidly disappearing. Should severe suppuration occur, instead of the lead acetate a few drops of creosote may be added to the resin ointment, as recommended by Druitt. By this treatment pain and shock are reduced to a minimum, opiates are seldom required, and danger to life is, he believes, greatly averted.

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Water in Steam.

Herr Stoupler, of Luzerne, Switzerland, by adding fluorescine to the water of a boiler, which by calorimetric test enabled him to detect the presence of one-half of 1 per cent of water carried mechanically out of the boiler by the steam, found that from 2·3 to 4 per cent was actually thus present in the steam. The deep green color of the water in the boiler was retained in it for weeks, and yet no trace of coloring could be detected in the water condensed in the steam cylinder, a proof that the water which gathers there is entirely due to condensation caused by the expansion of steam, and that very little water is actually mechanically carried away by the steam from boilers.

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* C. E. Sibley, in *Amateur Mechanics*.