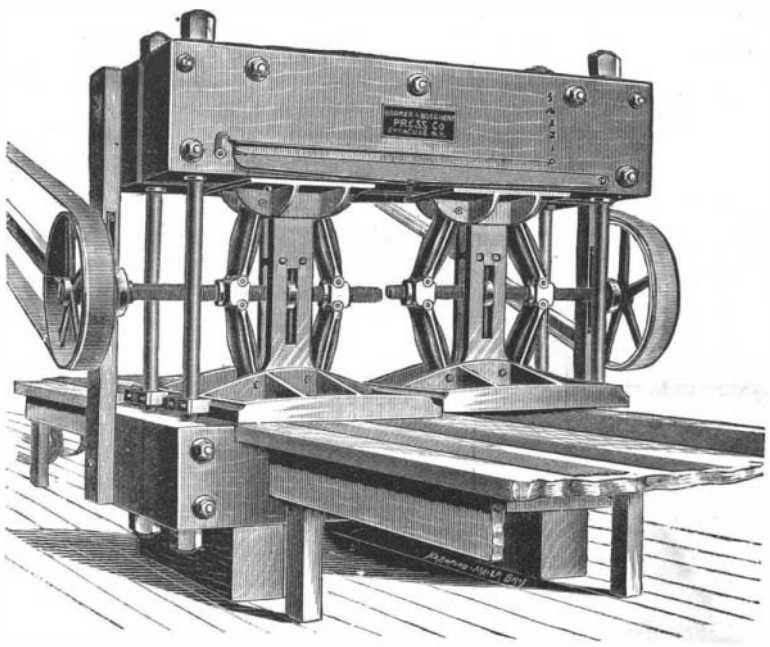
ducing statues to the same scale, but also of reducing or increasing at will the dimensions of a chosen model, through the aid of a few modifications in the respective positions of the counterpoints and of the bit, as well as in the different cog wheels of the gearings.

It has been possible to realize this application only through the facilities afforded by electric motors. As electric energy is not as yet distributed upon the left bank at Paris, recourse has been had to a Niel gas motor of 4 horse power, which actuates a Rechniewski dynamo, giving 70 volts and 45 amperes at an angular velocity of 1,800 revolutions per minute. This dynamo, in its turn, distributes the electric energy to the three motors whose different functions we have already mentioned, viz., to the electric drill, which consumes 70 volts and 30 amperes at an angular velocity of 7,000 revolutions per minute, to the motor that sets the statues in motion (70 volts and 6 amperes), and to the motor that moves the carriage vertically (70 volts and 9 amperes).

This sculpturing machine, which has been established for several months in Mr. Delin's studios, has, up to the present, given satisfactory results. Aside from the saving in time that it effects, it permits of very easily rough-hewing the pieces of wood, sketching the contours, and of having exact relative positions. The statue, thus-rough hewn in all its parts, is put into the hands of a skilled workman, who finishes it, and, when it comes from his hands, it leaves nothing more to be desired.—*La Nature.*

A DOUBLE BELTING PRESS.

There are many manufacturers of leather belting who have limited capital who, when called upon for an estimate of the cost of a wide belt, are unable to give it, because of the expense of putting in a large press, which must necessarily stand idle much of the time or be used on work which could be done on a smaller press to better advantage. To such the accompanying illustration and description will prove interesting. The press consists of one frame having the working parts of two presses. so that two belts of one-half the width of the press, or less, can be made at the same time and each operator be entirely independent of the other, while for wider belts both presses are used together, thus making a belt of the full width of the press; or the presses can be used to advantage by one press making two narrow belts, while in the other a wider one is being made. When a wide belt is made a steel plate is provided to fasten on the platen, thus obviating any danger of a crease where the two platens join. The manufacturers of this press, the Boomer & Boschert Press Co., Syracuse, N. Y., are well known, and some of the largest belts in this country have been made on their presses. The same firm also make a large line of presses for other purposes, using either the knuckle joint, screw or hydraulic principles, according to the work to be performed.



BOOMER & BOSCHERT'S DOUBLE BELTING PRESS.

A New Automatic System of Lighting and Extinguishing Street Gas Lamps.

Each lamp is supplied with two sal ammoniac batteries and a spark coil, placed in an iron box buried in the ground at the foot of the post. In the lantern is a miniature gasholder of about two cubic inches capacity, pivoted on a hinge and held down by weights; and directly over this holder is an automatic gas lighter, similar to those used in houses, only much simpler, larger and stronger. Two wires, about ten feet long, connect the lighter with the batteries through the post. Such an installation is under complete control from the gas works.

When it is desired to light the lamps of a city, it is only necessary to open the valve connecting one of the large gasholders at the works direct with the gas mains. This results in a decided increase of pressure in the gas all over the city, sufficient to cause all the little gasholders in the lamp posts to lift up about one-eighth of an inch against a platinum stop, and thus close the local battery circuit at each post. The automatic lighter being then supplied with current, immediately turns on and lights the gas. In a word, the system is merely a huge pneumatic push button, and corresponds precisely to pushing a button when desiring to light the gas in a house supplied with automatic lighters.

Fifteen seconds is sufficient for maintaining this increased pressure, to give time to make the increase everywhere felt. It can then he brought back to normal pressure, when the pressure gauge will drop back and open the electric circuit. This operation, if repeated, will extinguish the lamps.

The mechanism of the lighter is extremely simple, and made so strong as to insure it from getting out of order or requiring attention of any kind.

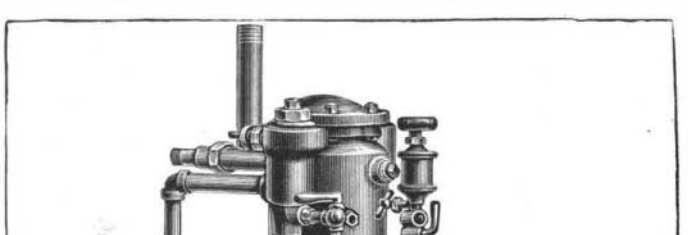
Hypnotism in Disease.

The chief arguments used against the employment of hypnotism in disease are, first, that it subordinates and enervates the will; second, that it renders the patient liable to be influenced by persons of evil intent; and, third, that only nervous or hysterical persons are subject to its influence. My own experience is that it may be used without injurious effects, and, also, that it may take the place of narcotics in a large number of cases in which they are now used. I have myself used it with advantage in delirium, in insanity, and in chronic alcoholism. I have successfully treated one case of kleptomania and two cases of excessive irritability of temper. At the same time hypnotism is a two-edged sword. Wielded by an unskilled hand, it may cut both ways deep into the faculties of intellection and into the nervous system generally. Also, it should never be used save by a skilled hand upon patients of an unbalanced mind accompanied by what is known in medical parlance as *paranoia*. In my treatment of a perfectly healthy, calm, intelligent, unimaginative man, whom I operated on fifty-one times, I found that the diapason of his whole mental and emotional system would give forth concordant sensations of pleasure, or discordant sensations of pain, at the will of the operator.

Summing up, I would say that hypnotism, as with every other new remedy, there is great danger that, on the one hand, it may be used indiscriminately, or, on the other hand, be scouted by a senseless skepticism. It has, beyond doubt, its definite limits of usefulness, and the medical man of the present day, realizing the futility of many of the old methods of treating disease, should keep his mind open to the reception of every new discovery.—*James R. Cooke, M.D., in the Arena, Boston.*

AN IMPROVED GAS ENGINE.

The gas engine shown in the illustration affords a notable example of the excellence to which this class of motor is brought at the present day. It was but a few years ago that the gas engine was but little better than a toy; noisy and expensive in its operation and with but little promise of ever becoming a rival of the steam engine. Now, however, their action (in the best makes) is smooth and regular and their economy compares favorably with that of the steam engine. The Olin gas engines present many points of excellence. They are strong and simple in construction. Every part is easily and almost instantly accessible. The charge is ignited by an electric spark, making them very safe, cleanly and free from odor. The governing is accomplished by a simple shaft governor, which has been found by careful test to easily control the speed with a variation of but 2 per cent from full load to no load. This sensitiveness, together with its positive igniting mechanism, makes the engine especially adapted for running dynamos for electric lighting. The lubrication is thoroughly automatic. The valves are of the poppet style and require no lubricant. These engines are being built in sizes from ¼ to 25 horse power. One design of these engines, made especially for driving coffee mills or other light work, is remarkable for its compactness and power. They take up a floor space of only 14 by 16 inches, are 23 inches high and use but 15 feet of manufactured gas per hour. These small engines are also built combined with pumps and are used for pumping water in high buildings, flats, etc. They will raise 400 gallons of water per hour 50 feet, with a consumption of 15 feet of gas. Where desired, any of these engines may be fitted with a gasoline attachment, adapting them for places where gas is not available. They are manufactured by the Olin Gas Engine Co., 222 Chicago Street, Buffalo, N. Y.

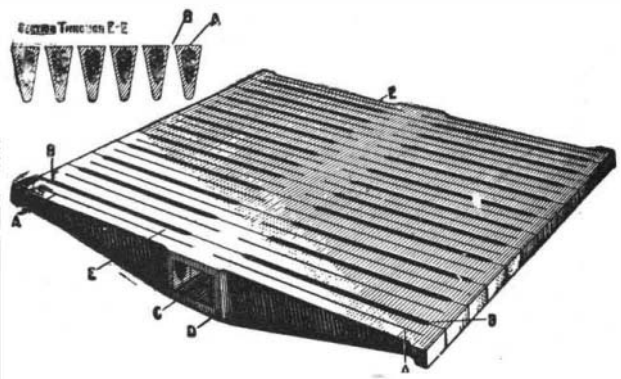


THE OLIN GAS ENGINE.

THE GADEY AIR GRATE.

This improved grate is made of hollow cast iron grate bars as shown in the sectional view.

In the top of each bar and running its entire length is a slot, A, A, about an eighth of an inch in width,



THE GADEY AIR GRATE.

through which a regular supply of air is delivered on the surface of the grate at the point of combustion. This supply of air is aided by the natural draught coming through the openings, B, B, between the bars. Through the center of the bars and across the entire furnace extends a supply chamber, C, to be kept continuously full of air by means of a small pressure blower. The side surfaces of each bar at the point, D, are planed so as to form an air-tight joint when the bars are placed together.

A one horse power blower will furnish sufficient air supply to boilers of 100 horse power or less. No alteration or reconstruction of either the fire box or chimney is required for the introduction of this improvement. The exact size and shape of the bars they are to replace are copied in making the patterns for the Gadey air grate.

It will be seen that this method of supplying air does not constitute forced draught, as commonly understood, because the natural draught admitted between the grate bars is employed in conjunction with the air blast through the hollow bars, thus enabling uniform and complete combustion to be maintained over the entire grate surface and increasing the capacity of any boiler where the improvement is introduced. It is especially advantageous in burning any small coal or screenings of coal, as well as such fuels as sawdust and mill waste from any kind of wood, bagasse from sugar cane and waste from cotton seed; in fact, any fuel requiring quick combustion to utilize it for steam purposes.

The constant circulation of air inside the bars tends to prevent clinker from adhering to the grate and also prevents the bars from being easily burned out.

This improved grate is patented and manufactured by Brown Bros. Manufacturing Company, Jackson and Clinton Streets, Chicago, Ill.

Boils.

Dr. E. L. Tiffany, of Princeton, N. J., in the *Eclectic Medical Journal* for December, considers the use of a fluid extract of barosma crenat., ʒj, in plenty of water, four times a day, to be a rapid cure for boils.

Birds which Sing on the Nest.

BY MORRIS GIBBS, KALAMAZOO, MICH.

Among birds, the females do not sing, and althongh many species have musical call notes and agreeable tones in conversation, which are shared in by both sexes, still the true song is only rendered by the male bird. I am sincere in saying that the lady bird talks more than her mate about the house, but I will admit that when away from home she is very discreet in this respect. In attending to her duties of incubation she is very quiet, and it is seldom that a note is heard from her while on the nest. It has even been said that all birds are silent when incubating, so as to avoid observation. However, although most species are quiet when sitting, there are a few which chirp loudly when so engaged, and some even burst into exuberant song.

Few observers are aware how assiduous are the attentions of the two birds to one another during incubation, and the credit which is due to the father bird in his devotion in covering the eggs in his mate's absence is not allowed him.

Of course, when a bird is heard singing on the nest we know that the notes come from the male, but many young observers are inclined to attribute the song to the female. Another source of error in failing to identify the sex occurs with those species in wbicb the singing male assumes tbe plumage of the female until the second or third year.

The chipping sparrow sometimes sings his chattering refrain while upon the eggs. Yellow warblers are not rarely heard singing from the nest, but one has to wait patiently in a neighboring copse, at the proper season, in order to hear, see and be convinced.

I have once beard the Maryland yellow-throat's song from its concealed nest in the grass; in fact, I found the nest, from bearing the peculiar notes, almost at my feet. Several times the song of the house wren has reached me, coming from the cavity where the old bird was sitting solacing himself in his gloomy nesting spot.

Once each I have heard the notes of the black-billed cuckoo, scarlet tanager, orchard oriole, goldfinch and the hermit thrush, the latter the only thrush whose song has positively reached me from the nest. One would think that tbe brown thrush, cat bird and robin, as great singers, would burst forth on the nest, but it must be borne in mind that these thrushes all prefer higher perches for singing, while the hermit is a ground nester and often sings on the ground.

But of all tbe species which are musical while sitting. the warbling vireo heads the list, both for persistence and for beauty of song, according to my note-book. Any one can listen to the song of the warbling vireo on the nest if the trouble to find a nest with eggs in May or June is taken. For when the mate takes his trick keeping the eggs warm, he cheers himself, and enlivens the surroundings by pouring forth his rippling, inspiring melodious warble. I have heard him sing from the nest in early morning, in the hottest part of the day, and in the early twilight, and I bave heard him issue as many as twenty bursts of song during one spell on the nest, and have discovered tbe nest on more than one occasion by the sweetly modulated tell-tale song.

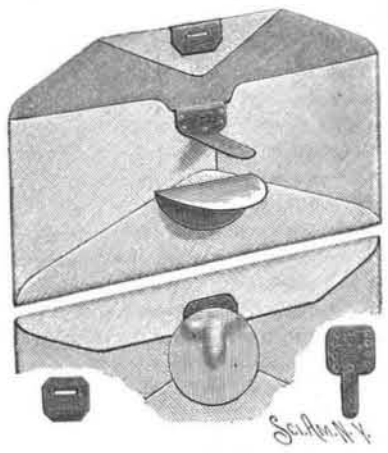
These ten species are all the birds which I have found to sing while on the nest.—*Science.*

Football.

Dr. Amidon, of New York, has taken the pains to make a list from the *Lancet's* reports of accidents that came to the notice of the editor in tbe year 1892. How many casualties escaped noticecannot be told. In this year 23 deaths occurred in England that were directly traceable to football. Those indirect ones that occurred subsequently or that will occur are left for future historians. Here is Dr. Amidon's little list of tbe English accidents requiring hospital treatment: Concussion of brain, 3; injury to the bead, 1; injury to the nose, 1; fracture of the nose, 1; fracture of the jaw, 1; fracture of the collar-bone, 20; dislocation of arm, 1; compound fracture of arm, 3; fracture of arm, 5; bad fracture of left arm, 2; serious injury to arm, 1; compound fracture of tbe elbow, 1; fracture of the left wrist, 1; fracture of ribs, 3; severe sprain of thigh muscles, 1; fracture of thigh, 3; injury to leg, 1; fracture of leg, 29; bad fracture of leg. 1; compound fracture of leg, 5; fracture of knee-cap. 1; severe injury to knee-cap, 2; fracture of ankle, 3; dislocation of ankle, 1; sprained ankle, muscles, and tendons severely wrenched, 1; severe injury to foot, 1; fracture of spine, 1; serious injury to spine, 1; serious injury in groin, 1; severe internal injuries, 2; severe internal injuries, fatal in two days, 1; fatal abdominal injuries, 6; undescribed accidents followed by death, 3; undescribed accident followed by lock-jaw and death, 1. Total number of grave injuries, 109. For the year 1893 the returns are not yet in. In the *Lancet* of November 18 there are recorded, as occurring during the preceding week, three cases of fractured leg; one of kick in abdomen, with death; one of concussion of spine; one of fractured clavicle; one of injury and death. This year, therefore, there have been at least twenty-eight deaths in England.—*Medical Record.*

AN IMPROVED FASTENING FOR ENVELOPES.

A durable fastener, permitting of the ready examination of the contents of an envelope, and yet well adapted to hold the envelope securely closed for filing away, is shown in the accompanying illustration, and forms the subject of a patent recently issued to Dr. George A. Harris, No. 301 North Laurel Street, Bridgeton, N. J. The improvement is applicable to any of the ordinary styles of envelope. At the junction or point of overlapping of the side flaps, a metallic re-enforce, or plate of thin perforated metal, is secured to the body of the envelope. The plate, shown in the small figure at the right, has at one edge an extension adapted to form a tongue, and is secured upon the envelope by being bent upon itself, the perforations aiding in retaining it in position. A metallic re-enforce, bent from a blank, as shown in the small figure at tbe left, is also attached to the flap of the envelope, and has an elongated slot adapted to receive the tongue, the envelope being then fastened by bending down the tongue. An adhesive flap is then secured over the fastening, or any other preferred form of seal may be employed, when the envelope cannot be opened without showing that it has been tampered with.



HARRIS' ENVELOPE FASTENING.

Snowflake Photography.

Mr. A. Sigson, a professional photographer at Rybinsk, contributes an account of his method of obtaining photographs of snowflakes to the *Journal of the Russian Physico-Chemical Society*. He used a Zeiss microscope provided with an aplanatic lens and a long focus camera. This was placed near an attic window at a strong inclination to the horizon. Tbe flakes were received on some rough cloth and transferred to a small net of cocoon fibers stuck on a card perforated in the middle. Tbis card was placed on the stage of the microscope, and the illumination was so arranged that half the field was uniformly illuminated and tbe other half shaded off. For an enlargement of fifteen times, the exposure lasted two to five seconds, witb plates supplied by M. Lumiere. To avoid the melting of tbe flakes by the breath of the operator, the latter is obliged to breathe through a pipe bent backward during the adjustment of the apparatus.

HENRY GOEBEL.

On December 4, the death of Henry Goebel occurred in this city, of pneumonia. Henry Goebel was born in 1818, in the village of Springer, a small place not far from Hanover, Germany. He received a fair education in tbe branches commonly taught in the public schools. He early developed the tastes of a mechanic and a fondness for skillfully working out his ideas in a material form. He early learned the trade of a watchmaker and optician. In the early part of 1849 he landed in New York. He soon began to work on electrical devices and turned his attention to incandescent lamps, and in the early fifties, it is claimed, constructed lamps, first from cologne bottles and afterward from tube glass.

The hairpin lamp was the next form of lamp which be constructed, the leading-in wires being made of iron, platinum. or copper, or sometimes even of other metals. He also made numerous other lamps of the meat saw type from time to time, and during the period from 1860 to 1880 he gave away many lamps of his construction and exhibited many others to his friends. The story of his big telescope, which he exhibited in Union Square and elsewhere in New York City, and with which be used his incandescent lamps to attract customers, is too well known to need repetition here.

In 1881 Mr. Goebel became connected with the American Electric Light Company, and for some time made carbons for it. The reason Mr. Goebel gives why his lamps never came into practical or commercial use is tbe lack of a suitable source of current. He was obliged to rely upon primary batteries, which were both expensive and unsatisfactory. He did not hear of the application of the dynamo to electric lighting, he claims, until after his connection with the American Electric Light Company in 1881 or 1882, and it was about this time that he first heard of Edison and his work.

Mr. Goebel's connection with the recent incandescent lamp patent suits has so often been referred to and is so fresh in the minds of our readers that further comment seems unnecessary.—*Electrical World.*

Photographic Notes.

Removing Yellow, Green, Red, or Dichroic Fog.—Dr. Meniere, of Paris, advises the following treatment: Soak the negative in ordinary water for five minutes, and then immerse in—

Water	100 parts.
Bromide of sodium	3 "
Bromine water	3 "

Leave in for ten or fifteen minutes. The bleached image is well washed and dried, and the image redeveloped with an amidol-sulphite developer.—*Br. Jour.*

The Blue Process.—The following process for producing cyanotypes on paper is recommended by Herr F. Veress, the well known photographer of Hungary, in the *Photo. Almanach f.* 1893. Two solutions should be prepared:

SOLUTION A.

Iron and ammonia citrate	5 grammes.
Ammonium ferrocyanide	2 "
Oxalic acid	1 gramme.
Distilled water	120 c. c.

SOLUTION B.

Ferricyanide of potassium	8 grammes.
Ammonium ferricyanide	2 "
Distilled water	120 c. c.

The two solutions are mixed and then filtered. Previously moistened glossy baryta paper is floated on the filtered solution for about four minutes, when it is dried at 89° F. The paper is then printed in the usual manner beneath a negative. The prints are washed in soft water, and then placed one by one in a mixture of 100 parts water and 1 part of hydrochloric acid. They are allowed to remain in it about five minutes, until the image has become quite pure. Finally, the prints are well washed in clean water.

To produce blue printson canvasand silk, the following process is given by the same author: 5 grammes of arrowroot are dissolved in 50 c. c. of water; 2 grammes of gelatine are dissolved in 50 c. c. of warm water; 300 c. c. of water, to which has been added 1 gramme of ordinary white sugar, 10 dropsof glycerine, and 5 drops of a saturated solution of caustic potash, are boiled. and the arrowroot and gelatine solution added to it by constant stirring. The liquid is then filtered through flannel in a flat dish resting in a warm water bath. The fabric to be sensitized is placed on the liquid and allowed to float for from four to five minutes; it is then mounted on blotting paper, which is fastened to a drawing board and dried in a warm room. The fabric is sensitized and printed as described above, and it should be used soon, for it quickly loses its sensitiveness. Before fixing, the prints should be placed one by one between sheets of blotting paper. in order to avoid spots. Fixing is done, as above described, in water acidulated with hydrochloric acid.

How to Print on Marble.—Mr. Villon publishes the following process: Coat an unpolished plate of marble with the following solution: Benzine 500 parts, spirits of turpentine 500 parts, asphaltum 50 parts, pure wax 5 parts. When dry expose under a negative, which will take in sunshine about twenty minutes. Develop with spirits of turpentine or benzine. and wash in plenty of water. Now cover the plate where it is intended to be left white with an alcoholic solution of shellac, and immerse the same in any dye which is soluble in water. After a while, when enough of the coloring matter has entered the pores of the stone, it is taken out and polished. The effect is said to be very pretty.—*Photographisches Archiv.*

Thiosinamine as a Photo. Fixer.—Herr Valenta has experimented with thiosinamine as a fixing agent. He finds that silver chloride dissolves in a 1:10 solution of thiosinamine as easily as in hyposulphite, silver bromide dissolves less readily, and iodide scarcely at all. The new solvent, therefore, can only be employed for chloride papers.

Gelatine in Hot Weather.—If in bot weather the gelatine has a tendency to leave the support, *Der Amateur Photograph* recommends a preliminary immersion of the prints for five minutes in—

Potash alum	5 grammes.
Water	100 "

Wash and tone in—

Aluminum sulphocyanide	15 c. c.
Water	100 "
Gold chloride solution 1:10	10 "

Fixation and washing as usual. The aluminum sulphocyanide is a liquid.

Dr. A. Steinheil.—We have to announce the death, on the 4th ult., of Dr. Adolph Steinheil, a member of the well known firm of opticians in Munich. He assumed the direction of the house in 1862, thus succeeding his father. Astronomical optics engaged his particular attention, while he will ever be associated in photographic history with the aplanats and antiplanats bearing his name.