A Costly Patent.

One of the Paige typesetting machine patents, recently issued, "breaks the record" in the history of the patent business for the great bulk and complexity of the patent itself and the intricacy of the machine it covers. It is said that over a million dollars was expended on the machine before the construction of the first one was completed. It has no less than 18,000 separate parts, and does the setting, justifying, and distributing of type in a way which would be satisfactory were it not for the cost and complexity of the machine. In the development of this invention Mark Twain is reported to have invested nearly $250,000.

The first application filed for a patent on it contained 204 sheets of drawings, having over 1,000 separate views. During the eight years the case was pending in the office before allowance, the number of sheets was reduced to 163. When it is remembered that the majority of patents have only a single sheet of drawings, and that to require as many as ten sheets is an exception, the magnitude of the invention can be understood. The fees charged by the Patent Office are uniform for all cases, no matter how complex or how simple—$15 on filing the case and $20 additional on allowance of the patent.

When this case was filed it was turned over to an examiner who received a salary of $1,800, and he spent six weeks in studying the case before being able to take the first action. The entire specification was twice rewritten, each time by a different attorney. How much this cost the inventor is not known, but it is safe to say that the Patent Office lost heavily. It is estimated that it consumed about $1,000 worth of the time of the various Patent Office officials before maturing into a patent, and when issued the usual rule had to be followed of preparing copies for sale at the regulation price.

The large number of sheets of drawings had to be photo-lithographed and the entire body of the specifications and claims set up in type, costing for the first edition, as estimated by the ordinary rules, a few cents over $6 a copy. These copies were sold to the public at the usual price until the first edition was exhausted, when the Patent Office stopped the issue. A great many people ordered copies of this patent out of curiosity.

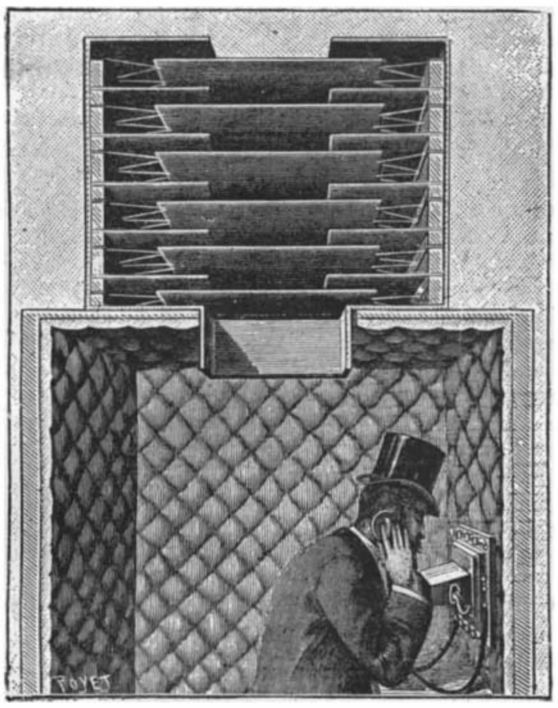
A TRANSPORTED CALIFORNIA "GREAT TREE."

The accompanying illustration shows the great tree General Noble (named after General Noble, late Secretary of the Interior) as it now stands in the mall at Washington, D. C., between the Agricultural Department building and the Smithsonian Institution, which is shown in the distance. Among the multitudinous marvels of nature, none surpass in majesty and grandeur the great trees of California; no such trees are found in any other part of the world; they were first discovered in 1852 by a hunter, Mr. A. T. Boyd, and at once attracted general attention, and attained the widest celebrity. The genus, a species of redwood (Sequoia gigantea), was named in honor of Sequoia (pronounced Sequoyal), a Cherokee Indian of mixed blood. This specimen was 26 feet in diameter at base, 81 feet 6 inches in circumference and 300 feet in height, the section being taken about 20 feet from the ground; although considerably smaller than some others, it was found to be comparatively well preserved and symmetrical. It had to be hauled by teams of sixteen mules each, on heavy trucks built for the purpose, a distance of sixty miles on a rough mountain road; price paid for cutting, hauling and delivering on cars was $7,500; section was divided into forty-six smaller sections, some of these pieces weighing over four tons; it took eleven cars to transport it to Chicago, where it was exhibited at the Exposition; total cost of hauling and installing at the Exposition was $10,475.87; the additional expense of placing it in its present position would probably make a grand total of over $12,000. As will be seen by plan, the interior diameter is about 13 feet, and average thickness about 20 inches; a circular iron staircase leads to platform about 18 feet above; it has been roofed over and shingled with round butt shingles painted red; four dormer windows light the interior. Our engraving was made from a photograph taken specially for the SCIENTIFIC AMERICAN.

A CALIFORNIA "GREAT TREE" IN WASHINGTON.

A VENTILATOR FOR TELEPHONE CABINETS.

Telephone cabinets are so arranged as to smother sounds, as well as those who remain in them. In order that the conversation, which is to be carried on in a loud voice, shall not be heard outside, no provision is made for the least ventilation. It is well known how difficult it sometimes is in Paris to obtain communications, and it is a genuine punishment when it becomes necessary to remain ten minutes in one of these silk padded boxes.



MENIER'S VENTILATOR FOR TELEPHONE CABINETS.

We recognize the fact that the question is quite a delicate one; for, on the one hand, although for many reasons it is necessary to assure the ventilation of the cabinet, it is also indispensable to guarantee the secrets of conversation in an absolute manner, as it often has reference to important family or business matters in which those interested should alone take part. So we think it well to make known to those whom the question interests a simple and ingenious arrangement devised by Mr. H. Menier and applied for some months past in his offices.

In the top of the cabinet there is formed a wide aperture over which is placed a box open at the top and bottom. In the latter are arranged, one above the other, a series of boards, of the same size as the box, resting upon ledges and covered with cloth. In the center of each of these there is a wide square aperture. Other and smaller boards, likewise covered with cloth, but supported by cords attached to the sides of the box, are interposed between the first. This obstructive arrangement gives the air a wide circulation, and, as proved by experience, completely annuls vibrations. In order to assure himself of this latter condition, Mr. Menier installed one of these apparatus over an aperture formed in a wall separating two rooms, and found that two persons standing at the distance of three feet on each side could not converse, even in a loud voice.

This arrangement therefore completely solves, at slight expense, the double problem of ventilation and the smothering of sound.

We are indebted to La Nature for the illustration and article.

Discoveries in South Russia.

Our Odessa correspondent tells us that the curator of the St. Petersburg Imperial Archæological Committee, Mr. Goshkevitch, has made some archæological discoveries along the banks of the Dnieper (Borysthenes) and the Bug (Hypanis). Opposite the village of Kisliakovka are the ruins of the ancient town of Olbia, described by Herodotus as surrounded by a wall with many towers, and distinguished for its extensive trade and its civilization. The ramparts and inner parts are well preserved, and terra cotta figures with subjects from domestic life, pottery, and small vessels are continually being discovered by the villagers. The number of ancient sites discovered by Mr. Goshkevitch is 15. Each is situated on the steep bank of the river, which forms a natural defense against surprise attacks, and the other three sides are surrounded by ramparts in a good state of preservation, with the ruins of dwelling places within the walls. At Propastnoe, on the edge of the ravine of the same name, many ancient Greek vessels were found, and both here and on the banks of the Bug were found pieces of money of the time of Emperor Theodosius the Great, who reigned near the end of the fourth century. In the village of Kisliakovka evident traces were discovered of an ancient Greek settlement, and the curator discovered a head of a statue. The peasants a short time ago unearthed a splendid Greek statue, but, being ignorant of its value, they destroyed it, although they sell to the first buyer the coins they find at the ancient site of Olbia, and many private persons in those parts have splendid numismatic collections of the Scythian and other periods.

In a tumulus near the well-known Borysthenian burying ground was found a vault-like chamber, faced with oak blocks, and a floor made white with cement or lime. A skeleton was lying on a stone slab with extended arm bones and on the wrist a bracelet of pure gold. Around the neck were four finely worked gold and amber necklaces, and at the hip bone was a kind of knife or sword. Thirty bone arrows in a quiver, as well as a corytos or bow case, were near the skull, but the quiver crumbled away on exposure to the air. The skeleton crumbled to dust on being touched. Mr. Goshkevitch thinks it belongs to the Scythian period. In a ravine opening up into the valley of the Borysthenes (Dnieper) a considerable number of mammoth bones were discovered.

The curator has brought away to the Kherson Museum a massive piece of statuary having on its two sides crosses and cypress leaves, as well as a bunch of "prisob." This work is believed to belong to the period when the Genoese colonies were flourishing on the shores of the Black Sea.—London Times.

Elvind Astrup.

Elvind Astrup, who was Lieut. Peary's companion on his first trip across the inland ice, and who was with Mr. Peary on his second and third expeditions, started a few days before Christmas for the purpose of making a ski excursion in the mountains of Norway. Three weeks having elapsed, his friends became alarmed and sent a party to search for him. Astrup was found frozen to death in the Lille Elvedal Valley, in the Dovrefjeld Mountains. He did excellent work when with Mr. Peary and gave great promise of being an independent Arctic explorer of note.

Experiments on the Poisonous Action of Acetylene.*

Thanks to the extreme kindness of M. Moissan, who has given me a sufficient amount of calcium carbide to prepare several hundred liters of acetylene, I have been able to make a series of comparative experiments, which I have the honor of presenting to the academy.

I caused to be introduced into a mercury test glass, well dried, 400 grammes of carbide of calcium. A rubber cork pierced with two holes received a glass funnel with a cock in it and the other end a conducting tube, which carried the gas obtained by the flowing of water, through the glass retort, which allowed the regulation of the outflow; when all the air had been forced out, and when the gas obtained burned without explosion, the acetylene was received in a gasometer (model of Dr. Saint-Martin).

I successively titrated mixtures of acetylene, of air, and of oxygen, adding always 20·8 of oxygen as in the atmospheric air.

Mixture of 20 to 100.—I caused a dog to breathe a mixture composed of 20 to 100 of acetylene; the animal remained quiet; the respiratory movements became larger in extent. At the end of 35 minutes, 44 c. c. of arterial blood was injected into the empty receiver of the mercury pump, and I extracted the gas which had been collected over the mercury, in a little bell with a glass cock; after the absorption of the carbonic acid by potash, the gaseous residue was introduced into the fire damp indicator, whose receptacle had been filled with three quarts of air, and the gaseous mixture was contained in the receptacle and in the entire length of the graduated tube. At the first passage of the current, we saw a very clear blue flame and a detonation was produced with a sharp sound; the reduction was equal to 82·4 divisions and indicated a considerable volume of acetylene, which had been absorbed by the blood; 1 c. c. of acetylene giving a reduction three times as large as that of carbonic oxide gives; that is to say, $3 \times 6{\cdot}6 = 19{\cdot}8$ degrees in my fire damp indicator; 100 c. c. of blood contained 10 c. c. of acetylene.

Mixture of 40 to 100.—The oxygen of Passy contains 90 to 100 of the pure oxygen. In order to obtain a mixture of acetylene of 40 to 100, the calculation indicated that it was necessary to add 55 liters of this gas, 66 liters of air, and 16·5 liters of oxygen, in order to prepare a mixture containing 79 of acetylene and 20·8 of oxygen. A dog who breathed this mixture, after having presented a long period of agitation, circulated in its lungs 112 liters of the mixture. Suddenly, 51 minutes after the commencement of the experiment, the animal extended its paws and died; the heart had stopped; we drew off the blood into the lower vena cava; it revealed in the fire damp indicator the presence of 20 c. c. of acetylene in 100 c. c. of blood.

Mixture of 79 to 100.—I made a mixture of acetylene and oxygen in which combustible gas replaced the nitrogen of the air. At the end, a dog caused to breathe this mixture presented a continual agitation and very ample respiratory movements. Eleven minutes afterward, we observed general convulsions; 27 minutes after the commencement, he extended his paws, and there were some painful respiratory movements, which preceded death.

This mixture of 79 to 100 was conducted into a bell formed glass jar in which there was a guinea pig. In 6 minutes the animal fell upon its flank; had convulsions, fluttering movements of the limbs and of the head. At the end of 39 minutes, we drew out the animal, which rested flat on its flank. Some minutes later the guinea pig raised itself and revived, but it died during the night.

I concluded from my experiments that the acetylene is poisonous when one employs a strong dose, if administered in large doses between 40 to 100 and 79 to 100. The employment of the fire damp indicator easily allowed the discovery of this gas in the blood.

I endeavored also to compare the poisonous quality of acetylene with that of illuminating gas. Starting from the fact often proved by analysis that coal gas (illuminating gas) contains 7 to 100 of carbonic oxide, I made a mixture of 150 liters of air, 5·3 of oxygen, and 20 liters of coal gas, which should contain 1 to 100 of carbonic oxide and 20·8 of oxygen. A dog forced to breathe this mixture presented at the end of 3 minutes a lively agitation, and at the end of 6 minutes very violent movements of agitation. We took, 10 minutes after the commencement of the experiment, blood from the carotid artery, and from 100 c. c. we could withdraw 27 c. c. of carbonic oxide. The dog when released remained lying on the floor—was very sick; and if the experiment had lasted some minutes more, it would have died. Illuminating gas is, therefore, much more poisonous than acetylene.

Exposition at Montreal.

The British Empire Exposition and International Display of All Nations will be held in Montreal, Canada, from May 24 to October 12, 1896. The plans of the exposition include an electrical display, and the successful exhibitors will receive handsome awards.

*By M. N. Grehant, in Comptes Rendus.

Correspondence.

ELECTRIC IGNITERS FOR GAS ENGINES.

To the Editor of the SCIENTIFIC AMERICAN:

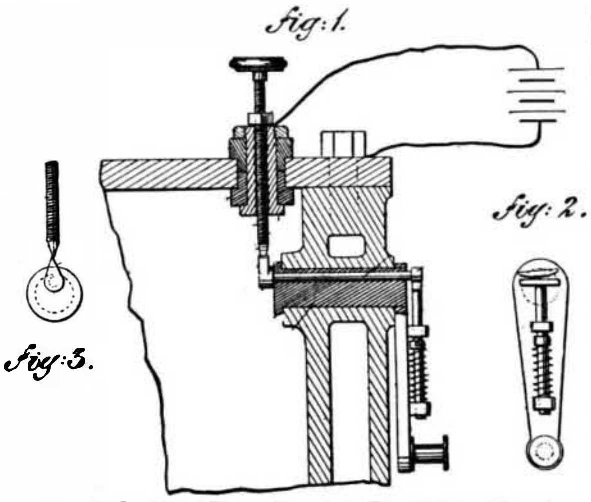
Allow me to call your attention to the fact that the rotary spark arrangement, Figs. 3 and 4, in an article on "Electric Igniters for Gas Engines," by George M. Hopkins, in your issue of January 11, is covered by my patent No. 546,238, of September 10, 1895, which particularly describes and claims the eccentrically bored spindle. FRANK S. MEAD.

Montreal, Canada.

[The several devices illustrated in the article referred to are based on the principle of the ordinary electric igniter used in connection with burners for illuminating gas. These illustrations were given merely as suggestions, leaving it to the reader to make the practical application. When this article was published the writer did not know that there was in existence a patent for a device similar to one shown in the article.

As Mr. Mead has called our attention to the similarity existing between his device and that of one of the illustrations, we reproduce some of the figures shown in his patent. This igniter is arranged to give a strong spark from a current derived from a battery, which insures the ignition of the explosive mixture at the proper time, and although no spark coil is shown in the circuit of the battery, we presume it was the intention to use a coil.

As shown in Fig. 1, the cylinder of a gas or oil engine is provided with the usual jacket, the end of the cylinder being closed by a cylinder head. In the cylinder wall is mounted a rock shaft connected at its outer end with a crank arm, as shown, or the shaft may be provided with a wheel receiving rotary motion from some revolving part of the engine. In the shaft is mounted eccentrically an electrode provided at its outer end with a cross bar on which presses the head



MEAD'S ELECTRIC IGNITER FOR GAS ENGINES.

on the end of the spring-pressed rod carried by the crank arm. On the end of the electrode within the cylinder is secured a pointed arm, as indicated in Fig. 3, adapted to engage the pointed end of a fixed electrode inserted in a sleeve held in the insulating bushings in the cylinder head. On the upper end of the electrode is secured a hand wheel to facilitate setting the point in proper position relative to the point of the arm of the movable electrode. A wire from an electric generator is connected with the adjustable electrode, and another wire from the generator is attached to some part of the cylinder.

It will be seen that when a rocking motion is given to the shaft by the crank arm, the spring-pressed head engages the cross bar, causing the movable electrode to move in line with the crank arm, and the oscillating electrode is moved into contact with the point of the fixed electrode, and by turning in its bearings in the shaft it finally passes the fixed electrode and produces the spark which ignites the explosive mixture in the cylinder. A similar result is obtained when a complete rotary motion is given to the shaft.

In the article to which reference has been made it was suggested that a small dynamo had been used successfully for producing the ignition. A correspondent has inquired as to the method of using a dynamo for igniting the explosive mixture. The dynamo is driven by the engine, and its terminals are connected with the movable and fixed contact points. When the points are separated, a spark is produced by the extra or self-induced current of the dynamo. No coil is needed.—ED.]

Call for a Motor Driven Sleigh.

To the Editor of the SCIENTIFIC AMERICAN:

We hear a good deal said about the horseless carriage. Why not take the sleigh in hand and move that with a similar motor? Such a sleigh would require the addition of a driving wheel back of the seat and midway between the two runners. This wheel would have a semi-free vertical movement and would be kept close to the road's surface either by weighting or by a spring or springs above it. It would need to be light, should have a polished surface, and should be rimless at edge, thus offering little, if any, chance for snow to adhere to it. At points around the margin of the wheel, two or three inches apart, little projecting spurs would give it the required hold upon the road to insure a forward movement to the vehicle. This wheel would get its motion from a crank or band connected with the oil or other motor, under the seat, as in the horseless carriage.

To guide our sleigh, a rudder-like fixture would be attached to the rear end of each runner, and the two would be moved, in concert, by the sleigh's occupant.

A long brake, following the side of each runner, would have a roughened or lower surface, which would be brought to bear lengthwise upon the snow coating of the road by a bar, in the usual place, at the side of the carriage seat.

It seems to me the successful horseless sleigh is an easier problem to solve than that of the horseless carriage.

As to its rapidity of movement, it might easily outstrip the ordinary railroad train, if the road traveled would admit of it, or the occupant could bear the lively stirring up. B. F. LEEDS.

San Diego, Cal., December 6, 1895.

Care of Books.

Even to those who are most careful and particular with their loved and treasured libraries accidents will happen, and the human bookworm is at his or her wits' end to remove the difficulty, which threatens perhaps to ruin forever one or more of the choicest volumes.

An English magazine lately published the following items, which will probably be found useful by any librarian:

To remove ink stains from books—A small quantity of oxalic acid, diluted with water, applied with a camel's hair pencil and blotted with blotting paper, will, with two applications, remove all traces of the ink.

To remove grease spots—Lay powdered pipeclay each side of the spot and press with an iron as hot as the paper will bear without scorching.

To remove iron mould—Apply first a solution of sulphuret of potash and afterward one of oxalic acid. The sulphuret acts on the iron.

To kill and prevent bookworms—Take one-half ounce of camphor, powdered like salt, one-half ounce bitter apple, mix well, and spread on the book shelves. Renew every six months.

To polish old bindings—Thoroughly clean the leather by rubbing with a piece of flannel; if the leather is broken, fill up the holes with a little paste; beat up the yelk of an egg and rub it well over the covers with a piece of sponge; polish it by passing a hot iron over.

Do not allow books to be very long in too warm a place; gas affects them very much, Russia leather in particular.

Do not let books get damp or they will soon mildew, and it is almost impossible to remove it.

Books with clasps or raised sides damage those near them on the shelves.—Inland Printer.

Calcic Carbide as Motor Fuel.

The Gas World quotes some interesting figures given by Dr. Adolph Frank, of Charlottenburg, in a paper communicated by him to a foreign contemporary, and recommending the direct use of calcium carbide in motors, the gas being liberated as required by means of water, and not carried about in a compressed state in cylinders. According to the authority quoted, both the Bitterfeld and the Neuhausen works have improved their products up to 90 per cent yields, and, it is added, a price of 90s. a ton does not now look at all unlikely. The theoretical yield of acetylene is 26 pounds per 64 pounds of carbide, and the extra weight, that of the calcium, is a small matter in comparison with the expense and risk of fifty-atmosphere cylinders. Curiously enough, the liquefied acetylene obtainable from a given quantity of carbide occupies, as nearly as possible, twice the volume of the carbide itself.

The data arrived at are, for a 1,000 horse power marine engine, worked for 600 hours: Coal, at 1·54 pound per horse power per hour, 420 tons, occupying a space of 420 to 430 cubic meters; liquid acetylene, at 0·396 pound per horse power per hour, 108 tons, filling cylinders of an aggregate capacity of from 270 to 300 cubic meters, and of sufficient strength to withstand a pressure of 50 atmospheres; carbide of calcium, 90 per cent, or 36·56 per cent of acetylene by weight, total required, 300 tons, occupying 131 cubic meters only. In the last case the whole, which required protection from damp, etc., would not bring the space occupied up to 150 cubic meters. This (our contemporary remarks) is a very remarkable comparison in view of cases where storage capacity is all important, for the whole of the steam boilers would at the same time disappear; but, of course, in the meantime the price of carbide stands in the way of the practical adoption of acetylene for motor purposes.