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SCIENTIFIC AMERICAN SUPPLEMENT

No. 647.

For the Week Ending May 26, 1888.

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IMPORTANT DECISION IN THE EDISON ELECTRIC LIGHT SUITS.

In May, 1885, the Edison Electric Light Co. brought a number of suits for infringement of its patents against various electric light companies and others using incandescent plants. These suits were about eighty in number, and thirty of them were contested by the United States Electric Light Co., of New York.

Last April the latter cases were argued before Judge Wallace of the United States Circuit Court, and he has just rendered a decision against the Edison company.

From a broader point of view than that of the magnitude of the interests directly involved, the decision is of importance. It is based on the interpretation of Section 4,887 of the United States patent laws. This is the well known clause limiting the duration of an American patent to the term of the shortest foreign patent which may have been granted before it was granted in this country. The ground of the defense was that a patent for the same invention had been taken out in the Austro-Hungarian empire for one year, and by proper process was extended to two years, and expired on July 21, 1883. This date was prior to the commencement of the suit. The American patent bore an intermediate date of granting, August 22, 1882.

The decision covered the following points. The suit was brought subsequent to July 21, 1883. The court held that it could have no jurisdiction if the American patent expired on that day along with the Austro-Hungarian patent because suit was brought nearly two years later. The defendants' plea as to lack of jurisdiction was therefore allowed. The complainants had claimed, as application for an American patent was made before the inventor applied abroad, that section 4,887 should not apply. This Judge Wallace disallowed.

The injustice done by this much debated clause of our patent law is very evident in the present instance. Mr. Edison appears as the uncontested inventor of an immensely valuable system. Possibly by neglect a comparatively unimportant foreign patent is allowed to lapse. At once his invention is declared public property and at the mercy of any one who save for a technicality would be an infringer. Many lawyers have contended for the abolition *in toto* of this statutory restriction. In Edison's case the hardship caused by its application is emphasized by the fact that he had applied for his American patent first. The statute, however, is based on granting, not on application. A delay in action by the examiner, clerical inattention, or some other trivial cause might bring about the same result for any one. If so radical a measure as the abolition of the foreign limitation clause seems obnoxious, some change should be made. The time when the American patent is applied for should at least be made the critical point; it should not be the day of granting the patent. The date of application is fixed by the inventor's own action. The date of granting may depend on many other causes.

Much might be done by appropriate legislation in placing the relations of American and foreign patents on a better basis. The Industrial Union has had little effect. It is not in international action that the remedy is to be found. As the law now stands, the United States gives far greater privileges to foreigners than she receives from other nations. In England, for instance, a patent costs nearly twenty times as much as an American one, yet we give a foreign inventor a patent at our nominal rate. The United States should charge the foreigner as much as his government charges our citizens. A different rate for citizens of other countries could be established.

The equitable view of patents regards them as a franchise granted for a valuable consideration. The consideration is the publishing of the invention, and the price paid for such publication is the seventeen years' monopoly. In every sense of the term, our citizens are entitled to this privilege. It operates to stimulate invention and manufacturing industries, and has placed America at the head in the race for material progress. But it is not at all so clear that a foreign inventor should be allowed any patent. If his invention is published abroad by patenting, then the disclosure is made. The patent right is an artificial and statutory one, and can be equitably withheld. As far as the encouragement of manufacturing industries in America is concerned, patents to foreigners do little or nothing for it. A point well worth consideration is whether United States patents to foreign inventors should not be abolished.

In the particular case under consideration, a great hardship appears to have been done. A purely technical defense to allegations of infringement has carried the day against an undisputed inventor. It is evident that there is room here for special legislation. It is but a few months ago that attention was called to the renewal and extension by Congress of an expired patent. The Edison patents seem entitled to the same favor. They are declared as expired on a technical point. Their expiration for all that appears may have been due to the delays of the Patent Office officials. Their merit and originality are not impugned. Reparation is due, and can easily be awarded.

At the same time, without any appeal to an international tribunal or regulation, the obvious defects in that portion of our patent law relating to foreign patents and patentees might be brought into a better condition. International agreements inevitably lead to complications. America in the regulation of her industries and commerce should be as free as possible from foreign limitations. In these respects above all she should be independent. The action of the Patent Office and of our circuit courts, where patents are in issue, should not be based upon transactions with foreign officials and bureaus. In Congressional action only can a remedy be found.

THE UNDERGROUND PIPES OF LARGE CITIES.

The increasing requirements of modern civilization are well illustrated by the extent and variety of underground pipe systems now employed in large cities. Thus there are in actual operation:

1. Pipes for conveying and delivering illuminating gas.
2. Pipes for conveying and delivering fuel gas.
3. Pipes for conveying and delivering drinking water, and for fire purposes.
4. Pipes for conveying salt water for street sprinkling and for fire purposes.
5. Pipes for draining, and carrying off sewage and surface water.
6. Pipes for delivering hot water under high pressure, for heating purposes and power.
7. Pipes for delivering cold water under high pressure, for power.
8. Pipes for delivering live steam under pressure, for heating purposes and power.
9. Pipes for delivering compressed air, for purposes of power and ventilation.
10. Pipes for producing power where required, by vacuum or suction, and for ventilation.
11. Pipes for conveying letters and packages, by compressed air and by vacuum.
12. Pipes for regulating clocks, by compressed air.
13. Pipes for conveying mineral oils.
14. Pipes for electrical wires for electric lighting, electric railways, telephones, and telegraphy.
15. Pipes for power ropes for driving machinery, moving street railway cars, etc.

THE CARNEGIE SAVINGS BANK.

The firm of Carnegie, Phipps & Co., of Pittsburg, issued during the present month a circular to their employes, offering to take deposits from them not to exceed $2,000 for each individual, and to allow six per cent interest on the money. This offer was coupled with a statement that the firm, as hitherto, would continue to lend money at bond and mortgage to intending builders of homes. At the end of the circular the men were exhorted to adopt the practice of saving and investing some part of their earnings as a provision against old age. This offer represents what may be justly termed an advanced form of profit sharing. The rate of interest and the conditions are such that there is little probability of the banking account giving any profit to the firm. Too much praise cannot be awarded to the members of the partnership for showing so great and so judiciously conceived an interest in the affairs of their workmen.

ELECTRIC LIGHT FIRES.

The frequency of conflagration caused by electric light wires induced the Electric Club of Philadelphia to inquire into the means of preventing them. At a recent meeting, the report of a committee of four months' standing, under the chairmanship of Mr. H. B. Cutter, was presented. The various automatic cut-outs proposed by different inventors were considered, some utilizing the heating of a wire, some the action of a spring pulling against an armature of a magnet. The old arrangement of a fusible alloy cut-off was pronounced objectionable on account of the interruption produced when it melted, but this was obviated by an arrangement for throwing other fusible pieces into the circuit one after the other. Thus a momentary increase of current would only cause a momentary stoppage. It was evident that there is a good field for inventors here, in devising an efficient safeguard against too strong currents that may accidentally be thrown upon a wire unable to carry them without heating.

PROGRESS OF THE PHONOGRAPH.

We give elsewhere an account of the trial of the new Edison phonograph at the rooms of the Electrical Club in this city. The results are substantially the same as those described by us in connection with our illustrations of the new instrument, given in the SCIENTIFIC AMERICAN of December 31, 1887. A modified form of the phonograph, invented by Prof. Alexander Graham Bell and associates, is said to give excellent results.

Still another form has been perfected by Mr. Emile Berliner, of Washington, D. C., who recently read a paper on the subject before the Franklin Institute, Philadelphia, and also exhibited his new instrument, which he styles the "gramophone." One of the distinguishing features of this invention is that the indentations of the transmitting diaphragm are made

upon a flat plate instead of a cylinder, as in the Edison and Bell devices.

Mr. Berliner, in his paper, reviewed the history of the telephone; the phonautograph, invented by Leon Scott and patented in France in 1857; the invention of Charles Cross, described in a sealed communication to the French Academy of Sciences, April 30, 1877, but which was not read until after Edison produced his phonograph. To Cross Mr. Berliner gives the credit of having first suggested the idea of a feasible plan for mechanically reproducing speech. He also referred to the graphophone, invented as an improvement on the phonograph, and the lately perfected phonograph of Edison, both of which use wax for receiving the impression instead of the tinfoil first used. In the gramophone a polished metal plate, generally zinc, is given a coating of etching ground, composed of beeswax digested in cold gasoline or benzine, which is extremely sensitive to the touch, but protects the plate from the influence of acids.

As the plate is revolved by clockwork, the stylus of the recording apparatus, which has a lateral instead of a vertical motion, as in the earlier inventions, cuts a waved line through the etching ground. The plate is etched with a solution of chromic acid, the groove being deepened by "rebiting," and placed in the reproducing machine. The latter is constructed on the same principles as the recorder, but of smaller dimensions and with more rigid mountings, the stylus being tipped with iridium to prevent its abrasion by continuous friction, and reproduces the sounds in much the same manner as the phonograph. In the demonstration Mr. William G. Fischer sang into the receiver parts of "Auld Lang Syne" and "When I Can Read My Title Clear," and Mr. Berliner recited into it a verse of "Mary Had a Little Lamb." When the plate was etched and placed in the reproducing machine, the sounds were reproduced with considerable fidelity to the originals.

MILITARY NOTES.

The recent assertion of General Wolseley that, if 100,000 hostile soldiers were landed on the British Isles, they could not be successfully opposed, because of the meagerness of the present military establishment, had the effect of waking up the old fogies of the war office, and setting Britain's legislators to thinking. The Premier made a very neat point on the General, who is said to be considerable of a martinet, by demanding to know how he could expect silent obedience from his subalterns, while himself publicly criticising his superiors. But he couldn't disprove the General's assertion that the country is wholly unprepared for war, save on paper, and so the breach in discipline and etiquette committed by the soldier was passed without further reproof, a large sum of money voted for the army, and steps taken toward reorganization on an effective basis.

General Wolseley seems to have thought that the urgency of the case warranted even so grave a breach of discipline, and the approving action of the commander in chief of the forces, the Duke of Cambridge, would imply that he did not overestimate the gravity of the situation. Though nominally only Adjutant-General, it should be remembered that Wolseley, in all likelihood, would be called to command should trouble come, for he has been called, perhaps not altogether facetiously, "England's only general;" and hence it is not at all strange that he should prefer to resign, indeed, he offered to do so, rather than shut his eyes any longer to what he regarded as fatal errors in the management of the army.

British troops have done great things in their day, and in the face of overpowering numbers, too, as when Wellington, with 25,000 men, some of them Spaniards and Portuguese and of no value, turned upon his 70,000 pursuers under Ney, at Busaco, in the Peninsular war, and beat them; and again when, in the Crimea, Col. Scarlet with a single brigade of cavalry, the "Heavy" brigade, charged successfully 10,000 Russian horse. These are but specimens of what the British soldier can do. History abounds with similar instances. But in those days, there is reason to believe, brawn and courage were of more value than now, when the direful machine gun and its cousin, the magazine rifle, have come into general use. The soldier whose nerves cannot stand the approach of cold steel has heart enough for the work behind the machine gun battery, and may prove a very demon with a repeating rifle on a half mile range.

And so it is that the British drum-beat, though heard around the world, is too widely distributed to make a deafening noise, and even in the British Isles it is scarcely more than a clatter when compared with the drum-beat of the Continental armies.

One of the results of General Wolseley's alarm was to give a large contract to our countryman Hiram Maxim, the inventor of an automatic machine gun that may fairly be called one of the wonders of this age, and which has been described and illustrated in the SCIENTIFIC AMERICAN. In it the recoil of the piece when once fired is utilized to throw out the empty shells, ram home fresh charges, and, at the same time, keep a column of cool water moving about the barrels to prevent heating. Left standing upon its tripod by a retreating army, it will keep up a rapid and murderous fire upon the advancing pursuers to the last second of effectiveness, and, if properly handled, may be made to scatter its deadly bullets along the ranks of an enemy, like a storm of iron hail blowing in his face.

Maxim first attracted attention in this country shortly after Edison had found a means of subdividing the electric light. As will be remembered, Edison used carbon filaments of bristol cardboard in his vacuum lamps. There being no such thing as a true vacuum in nature, the lamp when it left the mercury pump still contained enough oxygen to insure the gradual disintegration of the carbon loop. Maxim constructed a lamp on similar principles and filled it with the vapor of gasoline, which, when the carbon had been worn away by combustion, deposited a like amount of the same material on the threatened part, thus keeping the carbon loop in repair. But it stained the glass of the lamp also, and was little used, but was nevertheless an original idea, as was also the making of carbon loops out of carbon cut from gas retorts.

There is great alarm in Central Europe at the continual movement of Russian troops toward the Austrian frontier. *L'Avenir Militaire* quotes the journals of this district to the effect that the 19th (Stawropol) division of the Russian army, long stationed in the northern part of the Caucasus, is on its way to the Austro-Russian frontier. Russian diplomatsinsist that the continual movements of large bodies of troops toward the Austrian frontier is in accordance with the Czar's desire to strengthen the western limits of the empire, and have no other signification, but military Europe seems to be agreed that it means preparation for a war that is inevitable, and for which the Czar and his advisers are diligently seeking a pretext.

PHOTOGRAPHIC NOTES.

A Continuous Magnesium Powder Light.—On page 200 of the March 31, 1888, issue of the SCIENTIFIC AMERICAN is shown in Fig. 1 a method of blowing magnesium powder into a flame of alcohol by means of a pneumatic bulb. Dr. H. G. Piffard recently exhibited an improved method by which a continuous current of compressed air or oxygen gas, regulated by suitable stop cocks, forced the magnesium powder very evenly and rapidly out of its reservoir into the alcohol flame, producing an enormous magnesium flame of high actinic power. The oxygen intermingling with the magnesium particles aided its rapid combustion. The flame can be kept up as long as the powder is supplied. An ordinary cylinder of compressed oxygen, such as is furnished for the lime light, was employed.

The Cellulograph.—This beautiful new style of photograph was lately exhibited before the New York Society of Amateur Photographers, and is made by Mr. C. Theo. Cain, of Owensboro, Ky. A positive is made on glass with collodio-chloride emulsion, toned in the usual way, and then transferred on to a sheet of white celluloid. The process is quite simple. The resulting picture looks very similar to the well known ivorytypes. The sheet of celluloid can be easily embossed, shaped, and moulded into beautiful designs. It makes a very novel and durable picture.

Lantern Slide Mats.—A simple but quick way to construct dies to cut out lantern slide mats is to take a clock spring, file one edge down and bend it around a block of the desired shape of the mat, having the filed edge inward. Suitable holes are punched in the steel spring, through which screws pass, to fasten it to the block. The spring projects about one-fourth of an inch above the surface of the block, and when put in place presents a sharp cutting edge. The block should be made of hard wood. The paper is folded in four thicknesses, placed on the die, and is cut out by tapping on a hard wood block with a hammer, the block, of course, resting on the paper.

Purple Tones on Wet Plates.—To obtain purple tones it is customary to tone the plate before fixing with a solution of bichloride of palladium; but we have found a way of producing a brilliant purple tone during development.

The following is the formula for the developer:

Water	4 ounces.
Acetic acid	20 minims.
Pyrogallol	¾ grain.

The developer acts somewhat slower than iron and acetic acid, yet it proceeds gradually and rapidly. It is quite important to get, as near as possible, the right exposure.

After fixing in a hypo. bath one to six, the plate will have a beautiful purple tint, which is generally admired in transparencies and lantern slides.

Exhibition of Photographs.—A very large exhibition of photographs was held in Boston, Mass., between May 7 and 12, comprising the work of three amateur photographic clubs and others. It is said to have numbered nearly 1,000 pictures. Over 6,000 persons visited the exhibition.

Action of Water upon Wool Fibers.

Pure and, before all things, soft water, that is, water which contains as little foreign admixtures as possible, is just as indispensable for a good finishing as it is for washing and dyeing. It imparts to the wool a soft feel, and maintains its natural luster without increasing it noticeably or changing it into a shiny water luster. A continued treatment of teaseled cloth with hard water is just as injurious as one with soft water is advantageous. Any one wishing to make the trial can easily satisfy himself of the truth of this statement by teaseling two pieces of cloth, equal in all respects, the one with well water, the other with distilled water. Rain water also is very well suited for imparting to the wool fiber a soft feel and an agreeable luster. In the good old time, the majority of smaller manufacturers immersed finer grade napped cloth in a vat of carefully collected rain water for several days after teaseling or after the first steam-lustering, and considered this method as one imparting an especially delicate feel and nice, deep luster.

This luxury, if we may be permitted to so call it, cannot be indulged in by the large manufacturer of our day. Still, the small manufacturer may, whenever he produces a specially handsome line of cloth, go to this little extra manipulation—*provided* that sufficient quantities of soft water are at his disposal. Long rivers generally contain the best and softest water, which is doubtless due to the fact that the water is exposed to the ameliorating influence of air and sun for a longer time. The water of creeks and mountain streams is generally hard. Finishers living in a large cloth manufacturing district in Germany, through which a river flows, aver that its water in spring is not as good as at other seasons, because at this season it receives large quantities of water from the surrounding mountains and other immediate sources. Some even go so far as to assert that they are able to recognize the goods finished with water of the spring season.

It is obvious that the influence of water at a high degree of temperature must be much more intense upon the wool fiber, and naturally obstinate wool may, by treatment with hot or boiling water, be made more sensitive and pliable. If, after the nap-teaseling out of full water, the cloth is loosely rolled upon rollers, and immersed for five or six hours in water of from 170° to 190° F., it will assume a very nice feel, and a good, smooth face, with a dull luster. The cloth, being withdrawn from the bath after the specified time, must be unwrapped at once, taken into the washing machine warm, and rinsed with cold water for from one-half to three-quarters of an hour. By this treatment with hot water the wool fiber is to a certain degree lixiviated. It voids a peculiar slimy substance, after the removal of which, by rinsing, the fiber becomes more pliable. By omitting this rinsing and permitting the slimy substance to coagulate again upon the fiber, the principal effect is lost.

Here, also, this rule may be applied: The softer the water the greater the effect; and it has been found that the good appearance of the cloth is increased by the age of the water in the reservoir, that is, the oftener it has been used. It is natural that the foreign ingredients will separate from the water the oftener it is heated. At any rate, the reservoir must occasionally be emptied and cleaned, on account of the constantly forming sediment. Pieces of cloth which have been prepared for teaseling in the customary manner also become much softer in such a water, which, as aforesaid, had been used repeatedly. They teasel much more quickly, and take a softer and fuller nap than those treated with fresh water.

Our remarks referring to the operations in which the influence of water upon wool is to be considered, are also applicable to the treatment with steam in the steam lustering, steaming, and making ready for the needle. As is well known, steam is nothing more than water in a very finely divided form, and united with heat. Here, also, we find the ameliorating influence of the water upon the wool fiber accomplishing the desired effects, largely increased by heat.—*Industrial Record.*

The Flour Product of a Week.

According to the *Northwestern Miller* of May 11, the Minneapolis mills made 168,600 barrels of flour that week, and shipped 163,665 barrels, of which 47,800 barrels went abroad. The market is unsettled and dull, with prices higher. The St. Louis mills made 63,750 barrels that week. The market is fairly firm, but rather dull. The two largest mills at Winona, Minn., are temporarily idle, owing to high water in the Mississippi. The Indiana State convention was held at Indianapolis, with a large attendance, and decided to join the national association. The millers of the west-central Illinois district met at Springfield recently and formed a strong district organization. Thirty leading firm were enrolled and signed an agreement to work in harmony.