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SCIENTIFIC AMERICAN SUPPLEMENT

No. 851.

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A PROPOSED CONGRESSIONAL RESOLUTION RELATING TO PATENTS.

Representative Stout, of Michigan, has introduced in the House a resolution on the subject of the Bell telephone patents. A preamble to the resolution recites that the original patents of the American Bell Telephone Company will soon expire; that the company has been and is now the owner of certain devices, upon one of which, the Berliner transmitter, an application for a patent was filed in 1877 and the patent not issued until November 17, 1891, and that it is alleged that the final adjudication of those pretended rival claims has been delayed by the owners for the purpose of giving another term to an enormously lucrative patent. The resolution, therefore, requests the Committee on Patents to ascertain "whether any modification of the patent law is necessary to protect the public against undue monopoly, and report by bill or otherwise."

It is true, as set forth above, that soon after the Bell Telephone Patent was granted, March 7, 1876, another application for a patent for a telephone was made by Emile Berliner, to wit, on June 4, 1877, covering ground almost as broad as the Bell patent. This application of Berliner was sold and assigned to the Bell Co., was then kept back and held pending in the Patent Office for over fourteen years, and then issued, to wit, on November 17, 1891. So that the Berliner patent will run for seventeen years from that date.

Notwithstanding the clearest proofs that Phillip Reis, of Germany, had invented and put in successful operation an electric telephone in 1860, or sixteen years prior to Bell, but differing in form from Bell's; notwithstanding that an electric sound receiver, working on the very same principle as Bell's, had been invented and patented in this country by Royal E. House, in 1868, the Supreme Court of the United States upheld the Bell telephone patent in the broadest possible manner, and by its judgment practically debarred all other persons from making, using, or selling an electric telephone. Thus was created by judicial act one of the greatest monopolies of modern times. The Bell patent expires next year, March 7, 1893; but its holders are calculating that the new Berliner patent will practically give them an extension of their monopoly for fifteen years longer, or until the year 1908; and if the Supreme Court should be as willing to sustain the Berliner patent as it did the Bell patent, then the public will be cornered again and subjected to this prolonged corporate squeezing.

Bell's original patent consists substantially in connecting two diaphragms electrically in such a manner that when one diaphragm is spoken to, the other diaphragm will correspondently vibrate, thus producing in the ear the sensation of sound. The same thing was done by Reis and House and is done by means of the new Berliner patent; but the Berliner apparatus is different from Bell's, and for transmitting the voice is better than Bell's.

The Congressional resolution requests the Commissioner of Patents to ascertain whether any modification of the patent law is necessary to protect the public against undue monopoly, etc.

By undue monopoly we suppose is here meant such transactions as the holding back of the Berliner patent so as to spring it upon the public about the time the Bell patent expires, with a view to extend the telephone monopoly.

For the benefit of all concerned, we will suggest a couple of little amendments to the patent laws, which will not only prevent all such tricks as the above, but will save the Patent Office and inventors a world of trouble, put an end to vexatious delays in the grant of patents, and stop the expensive litigations, now rendered necessary in many cases, in order to obtain a patent.

The present statute relating to official examinations reads as follows:

"Sec. 4893. On the filing of any such application and the payment of the fees required by law, the Commissioner of Patents shall cause an examination to be made of the alleged new invention or discovery; and if on such examination it shall appear that the claimant is justly entitled to a patent under the law, and that the same is sufficiently useful and important, the Commissioner shall issue a patent therefor."

Our suggestion is that the above section be amended so as to read:

"Sec. 4893. On filing of any such application and the payment of the fees required by law, the Commissioner of Patents shall cause an examination to be made of the papers relating to the application, and if on such examination the papers are in proper form and the invention claimed is for a useful purpose, the Commissioner shall issue a patent therefor."

The effect of this slight amendment would be to dispense with the present system of official examinations into the novelty of the invention, and place that duty where it more properly belongs, namely, upon the applicant or his agent. When the present patent laws were enacted in 1836, such examination by the applicant was well nigh impossible, because the patents were not printed. But now they are printed, are easily accessible to the public, and examinations may be readily made by any skilled person.

This proposed change would relieve the Patent Office from a vast amount of labor, enable it to issue patents promptly to every applicant, prevent the holding back of cases on legal or technical grounds, and prove of the highest advantage to the public and to inventors.

The adoption of the above amendment would involve the repeal of the section relating to interferences, which reads as follows:

"Sec. 4904. Whenever an application is made for a patent which, in the opinion of the Commissioner, would interfere with any pending application, or with any unexpired patent, he shall give notice thereof to the applicants, or applicant, and patentee, as the case may be, and shall direct the primary examiner to proceed to determine the question of priority of invention. And the Commissioner may issue a patent to the party who is adjudged the prior inventor, unless the adverse party appeals from the decision of the primary examiner, or of the board of examiners in chief, as the case may be, within such time, not less than twenty days, as the Commissioner shall prescribe."

The repeal of this section and the doing away of novelty examinations would put an end to the expensive legal proceedings which the Patent Office is now obliged to carry on, and relegate the same to the courts, which is the proper place for such adjudications. The repeal would also render it impossible for any powerful Bell monopoly to keep an undue grasp upon the public.

The further advantages of these simple amendments we shall take occasion hereafter more fully to discuss.

THE SEVEN AGES OF OUR WORLD.

In a recent issue of the SCIENTIFIC AMERICAN we fully illustrated a scientific lecture entitled "A Trip to the Moon," which was given at the Carnegie Music Hall, in this city, for several weeks in succession.

This interesting lecture has been followed by another entitled "The Seven Ages of Our World, or from Chaos to Man," which is illustrated in much the same way. The lecturer began his discourse by stating the general belief of astronomers and physicists, which is to the effect that the earth must have existed at one time in a state of vapor, that is, it was merely a nebula, that gravitation asserting itself drew the nebulous particles nearer and nearer together until finally the matter assumed the shape of a sphere, that being the form which permits of the nearest approach of every particle of a mass toward the center of attraction.

The first scene, entitled Chaos, when first presented, is merely a mass of rushing vapors, accompanied by surging and seething sounds, indicating great activity in the chaotic mass. Gradually, and while weird colors play upon the vapor, it subsides, showing a globe with an unstable crust. The first land then appeared. After an interval, representing millions of years, the Devonian age was illustrated by a scene in which were volcanic eruptions, electrical displays in the form of lightning, and all of the seething, rumbling sounds which accompany a volcanic eruption. After another interval representing a few millions of years, a magnificent scene was presented, representing the carboniferous age, in which huge moss and rush-like plants were seen.

This was followed by a scene representng the formation of coal. The dense poisonous gases upon the earth at this age having been largely absorbed by vegetation, the supply of carbon in the atmosphere was so far diminished that it was insufficient for the support of these gigantic plants; consequently, they decayed and fell, forming the foundations for the coal beds which have been discovered in the more recent days of civilization. Next was presented a Permian landscape, which was followed by another scene representing the age of reptiles, and showing the monsters of the Jurassic time. Some of the creatures shown, the lecturer said, must have weighed 20 tons. Many remains of the larger reptiles of this age have been found in the western portion of our own country. Then followed a landscape of the Cretaceous era and a view at the bottom of a chalk sea. Then the audience was presented with a view representing the dawn of the modern world, showing a scene which the lecturer said might well be located in Central Park or some of the environs of the city.

In the illustration of the age of glaciers, which followed, was shown and the lecturer described the manner in which the huge mammoths were entombed in crystal ice. Then was given an illustration of the homes of the first men, the lake dwellers.

The last scene of the series represented the age of civilization, showing architecture in a high state of perfection, engineering works and modern dwellings. In this and in all of the other scenes the artistic work is very effective, and the mechanical and light effects are striking and sometimes startling.

The discourse delivered by Mr. Garrett P. Serviss was not only extremely interesting and entertaining, but highly instructive.

Car Coupler Legislation.

A correspondent to the *Railroad Gazette*, while discussing the prospective coupler legislation, calls attention to the fact that most of the bills provide that it shall be unnecessary to go between the cars either to couple or uncouple. He points out that it is necessary, with the M. C. B. couplers now generally in use, to go between the cars to open one of them when two with closed knuckles are approaching each other. He acknowledges that there are a number of couplers in which provision is made for opening them on the side of the car, but as it is desirable to reduce the number of parts to the smallest possible, the point might be covered by adding a clause to the law "making it illegal for the trainmen to go between the cars equipped with M. C. B. couplers while either portion of the train is in motion."

The correspondent's object in making this suggestion is good, for he thinks that it would make the trainmen more careful and would relieve the railroad company from any liability in a suit for damages. We think, however, that if any one will carefully consider the matter he will have some doubts as to the advisability of making the act illegal, and thus giving the railroad company security against a suit for damages. Some railroad companies have rules which compel the men to steer the link with a stick when coupling cars. Who ever saw a switchman make use of one of them? He knows that he cannot do his work in the time required, and he therefore discards the stick to save his position. The probability is that when all cars are equipped with the M. C. B. type of coupler the trainmen will have to open these knuckles when the car is in motion, either from the side of the car or stepping in between the tracks, or they will be unable to perform the amount of labor the railroad company thinks each man should do in a given time. The result would be that to get his work done and keep his position the switchman would have to go between the cars. In the meantime the law would give the company immunity from damage suits in case he is injured in so doing. This is not the right way to save the lives of trainmen.—*Railway Master Mechanic.*

Photographing Bullets.

An interesting lecture on this subject was recently delivered at the South Kensington Museum by Professor C. V. Boys.

His apparatus consists essentially of a box adapted from an old packing case, lined with black cloth, in which the photographic plate is exposed, of a condenser formed of a plate of glass about a foot square, of a smaller condenser in the form of a bottle, to act as a starter of the spark, and of a simple system of wire circuits and knobs to give the spark which throws the shadow of the bullet on the plate, and thus takes the photograph.

The bullet enters and leaves the box by two holes, covered with paper to exclude the light, and in passing the plate the bullet touches the terminals of two wires, composed of thin lead wire, thus partly completing the circuit; a small flash passes from the smaller condenser, causing a larger flash to pass between the knobs of the plate condenser inside the box, and this flash, lasting less than one millionth of a second, takes the photograph of the bullet, no lens being employed. A wet string in the circuit of the small condenser has a powerful effect in damping the electrical oscillations.

Before proceeding to these details Mr. Boys showed experimentally that an electric spark is chiefly concentrated in two points of light on the knobs, the intermediate path contributing little to the illumination except by phosphorescence and electrical oscillation. This was evident from the double image taken when both knobs threw their light on the photographic plate, but by screening off all but one knob, a clear, distinct image thrown by a single point of light is obtained on the plate and no lens is required. The suppression of the lens is important, as Mr. Boys also demonstrated by photographs that a lens absorbs about 90 per cent of the light.

The first photograph taken was of a pistol bullet, flying about 700 feet a second. This was fairly clear, and a curious obscurity about the base, which seemed at first due to the imperfection of the apparatus, was revealed in the second photograph as due to the wad sticking to the base of the bullet.

But the interest began with the photographs of bullets fired from the modern magazine rifle, with velocities of 2,000 f. s. and over, far exceeding the velocity of sound. Here was seen revealed most clearly and distinctly the front and rear waves of condensation and rarefaction, with the *vena contracta* of the trail of following vortices, exactly like what we see on looking down from a bridge at a screw tug on the river.

A perceptible difference could be detected between the angles of opening of the front and rear waves, which could only be due to the superior speed of propagation in air of the front wave of condensation, an interesting phenomenon in acoustics hitherto unsuspected. In some cases pieces of paper torn out by the bullet could be seen flying in rear, each accompanied by its trail of waves, which met and coalesced, and were reflected on the sides of the box.

By substituting aluminum for lead bullets, Mr. Boys was able to obtain velocities of over 3,000 f. s., which showed no defect of clearness of image, but the angles of the wave fronts were considerably modified. The wires appeared on the photographs close to the bullet, showing the exact instant at which the spark passed—a cloud at the end of the wire first touched being the image of the dust into which the lead wire was pulverized by the contact of the bullet. Similar photographs were shown of the passage at various stages of a bullet through a sheet of glass, the air waves set up by the lateral vibrations of the glass being very distinct, and affording a very clear idea of the lapse of time in the phenomenon.

There should be no difficulty in the application of this method of photography to the largest projectiles of heavy guns, and much valuable information would thus be obtained concerning the velocity, the resistance of the air, and the degree of steadiness of the projectile.

The photographs showed generally that the bullets had not had time to settle down to a steady flight, but were variously tilted across the path. By boring some holes across the axis of the bullet, the angular position at the photographic instant was determined by the hole which allowed the light to pass through it on to the plate. In this way Mr. Boys was able to infer that the bullet must have received some 3 per cent of its velocity after leaving the muzzle, at which point the turning effort of the rifling must have necessarily ceased. Mr. Boys interested the sporting members of his audience, at the conclusion of his lecture, by a brief account of his experiments on the photographs of small shot. No photograph was ready to be shown, but he mentioned that this method would reveal the essential difference between the cylinder and the choke-bore gun, not only in lateral dispersion—which can be measured at present on paper screens—but also in the longitudinal dispersion.—*The Engineer.*

John Calvin Moss.

This widely known photo-engraver died at his home in New York City, April 8, aged 56 years. He was one of the first of those who made a practical success of photo-engraving, among many who entered the field about the same time. He first worked at the printer's trade, afterward becoming a photographer, and at twenty years of age commenced experimenting on the etching of plates. In 1871, he was interested in the Actinic Company, and subsequently in the Photo-Engraving Company, which he left in 1880 to form the Moss Engraving Company, which has made a great business success of the photo-engraving process. The first "process" pictures, as they were called, were very faulty, principally from the low relief obtained, which made them especially difficult to print in ordinary type forms, but by years of experiment and hard work this method of making pictures has been brought to such a degree of perfection as to practically supersede the more laborious hand engraving for quite a number of purposes. Mr. Moss was married when he was 19 years of age, and his wife fully sympathized with him in his artistic tastes, actively aiding him in all his long course of experiments.

Starving Rats on a Wrecked Steamship.

A correspondent of the Newcastle *Chronicle* describes a striking scene he witnessed in the breaking up of the Gothenburg City, on St. Mary's Island, coast of Northumberland. I was one of a party that went on board that ill-fated vessel a few days before she broke up, and saw a sight to be remembered. I shall never forget it. To all appearance, as we approached her, the vessel might have been sailing comfortably out of harbor, save for the absence of any apparent life on board of her. But we had no sooner put foot on deck than we were immediately attacked in such a manner that such of us as had got on board had to make tracks for the rigging, while the rest fell back into the boats. Rats! I never saw so many in my life, and never hope to again. Great, hungry, lanky, lean-looking rats, many of them with their tails chewed off, swarmed up from below in never-ending thousands, squeaking and squirming over one another in a manner sickening and horrible to behold, particularly to those of us up in the rigging. At last we cut off some loose ropes, knotted them into convenient lengths, and so armed we descended and attacked the rodents, and eventually succeeded in beating a passage to our boat. Any one would have supposed that they knew by instinct the impending fate of the vessel, for they no sooner saw us over the side than they began to swarm down the ropes and try to enter the boat, and it was only with difficulty we were able to beat them off before casting the boat clear; and they squeaked in a horrible manner in their anguish and mad frenzy as we rowed away from the vessel's side. They were too far both from the island and the mainland to swim ashore. They could not feed on the timber and coal, and so that was washed ashore to warm the shins of the coast folk. While every other part of the vessel seemed to go to splinters, the deck-house, strange to say, came ashore on the island intact.

Ventilation.

The ventilation of school rooms, churches, theaters, public halls and apartments, should be chiefly secured by outlets near the ceiling, for here is where foul air primarily accumulates. An excellent article, by Dr. William Henry Thayer, of Brooklyn, N. Y., is given in a recent number of the *Sanitarian.* We abstract as follows:

Carbonic acid is much heavier than atmospheric air. But the air expired from the lungs, with 8½ per cent of carbonic acid, is so much expanded by the animal heat that it is lighter than the atmosphere, and consequently rises to the ceiling.

Aeriform bodies possess the property of diffusing themselves through each other's masses to an unlimited extent; there is no point at which they become saturated.

Carbonic acid gas, although fifty per cent heavier than common air, will be gradually diffused through the atmosphere, at whatever temperature. In the case of the air that is expired from our lungs, surcharged with carbonic acid, it rises at once in an active current to the highest part of the room, because it is expanded by its higher temperature to greater lightness than the air of the room. From the neighborhood of the ceiling it is very gradually diffused through every part of the room, but remains in excess at the top as long as the supply continues.

Dr. Edward Turner, in his "Elements of Chemistry," says: "There is no real foundation for the opinion that carbonic acid can separate itself from the great mass of the atmosphere, and accumulate in a low situation, merely by the force of gravity."

Dr. Neill Arnott, in his "Elements of Physics," says: "In a very close apartment ventilation must be expressly provided for by an opening near the ceiling, through which the impure air, rising from the respiration of the company, may pass away."

Walter N. Hartley, in his "Air in its Relations to Life," says: "All the foulest air is near the ceiling; in fact, it is so bad there that unless an easy outlet be provided, it becomes perfectly poisonous."

In 1869 Dr. R. Cresson Stiles, Assistant Sanitary Superintendent of the Metropolitan Board of Health, made a report on the qualities of the air of public buildings. He analyzed the air of public schools, hospitals, theaters, and churches, to ascertain the proportion of carbonic acid contained in it, and in some buildings measured the amount at different heights—near the floor and near the ceiling. His results varied with the different conditions of the rooms as to ventilation and air currents; but he says: "Air taken from near the ceiling was always found more highly charged with carbonic acid than that in the lower portions of a room, and the difference was often very marked. . . . In the hall of the Hamilton Literary Association, on the occasion of a meeting of the Kings County Medical Society, about eighty persons present, air taken within a foot of the ceiling, after three hours' occupation, gave 3·1 parts of carbonic acid per 1,000, while that taken at the same time within three feet of the floor gave one part per 1,000."

Dr. E. H. Bartley, chemist of the Brooklyn Health Department, made analyses of the air of St. Ann's at different heights, at a time when it was filled by the congregation.

The showing was, under the edge of the gallery, 19 parts of CO_2 in 10,000 of the air, while on the gallery, immediately over the place where the first sample was taken, about 40 in 10,000.

The carbonic acid in the air of our rooms resulting from respiration, in the limited amount in which it exists after diffusion, is not the sole or the chief injurious and dangerous element of that atmosphere. The organic matters which are contained in the expired air are more prejudicial to health; but as they are proportioned in amount to the accompanying carbonic acid, this gas "is taken as a convenient index to the amount of the impurities."

The conclusion, from all the evidence adduced, is that the carbonic acid gas of respiration and illumination will eventually be equally diffused through the atmosphere, although retained at the upper part of a room so long as the high temperature continues; and that it never, under any circumstances, is precipitated in excess to the lower part of the room.

One's ordinary perceptions may be trusted for the extremes of atmospheric conditions of a room; one perceives at once the difference between a very foul atmosphere and a very pure one. The hall of the Brooklyn Institute—burned last year—when occupied, impressed one on entering as having a delightful atmosphere. It was about twenty-five feet high, and ventilated by large openings in the ceiling over two chandeliers. The only objection to such an arrangement made by well informed people is the waste of heat. But when we take into consideration the immediate comfort and the prospective advantage to the health of the occupants, it is no waste; it is a little more fuel, but it is a great deal less sickness.