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THE DRIVEN WELL PATENT SUSTAINED.

On the 23d of the present month, the United States Supreme Court rendered two decisions in cases brought under the celebrated driven well patent, sustaining it, and adjudging the infringement of the patent as proved. For several reasons, these decisions are of widespread interest, both to laymen and to the professional world. An enormous number of driven wells have been constructed, and the royalties now collectible are very large, and those from whom they are to be collected comprise all classes of our people.

To understand what this amounts to, the history and claims of the original patent and of the reissue may be examined. The original drive well was devised by Norman W. Green, Colonel of the 76th New York Volunteers in 1861. In order to procure fresh water for his men, then encamped at Cortland, in this State, he drove a pointed rod into the ground until a water-bearing stratum was reached. Then he withdrew the rod, and introduced a tube into the aperture thus made, and through this tube or pipe the water was pumped. The claim of the original patent includes these three steps. In the reissue, the process later adopted is described and claimed, namely, the direct driving of a tube into the earth until the water supply is reached. This is the matter of the claim of the reissue, and in its coalescing of three steps into one a broadening of the matter seems visible. Yet this reissue has been sustained.

A further plea against the patent was made on the grounds of neglect to prosecute, and here Green was also fortunate. His first well was made in 1861, yet he only applied for his patent in 1866, some five years later. An effort was made to construe this into an abandonment of his invention to the public, but the attempt failed.

The ground taken by the Supreme Court on both these issues, ground favorable to the patentee, is of interest to inventors. It indicates a disposition on the part of the court to deal more liberally with patents. It had become almost an axiom that reissues could not be sustained, yet here is an instance where expanded claims and delay did not suffice to invalidate one.

Many of the recent attacks upon our patent system, that have been made of late years in Congress, have been to a great extent inspired by this famous patent.

If royalties under it were ever to be collected, it was clear that a vast number of individuals would be liable. The farmers throughout the country have put down drive wells, in many instances doing the whole work themselves. After enjoying the use of them for a number of years, it seemed almost an injustice to exact a royalty from the constructor or user. There was a simplicity about the device that seemed to remove it from the class of inventions. On consideration, this will be found a false view; and if the merits of the case be examined, it will be found that a most equitable decision has been rendered. The simplicity and obviousness of the device may seem extreme when once it is understood. But the fact that invention was required to devise it is clear, from the fact that it was never thought of until the year 1861. All the work of the inventors of past centuries had not led to the driving of a pipe into the ground for the procuring of water until Col. Green in his crude way did it in camp. This consideration should dispose of any doubts on the subject of inventors. The value of the method is in direct ratio to its simplicity. For the complex, expensive, and dangerous method of excavating wells, a method requiring expert labor and skill, was substituted a process that any intelligent person could carry out. The work of days was concentrated into a few hours, and the expense for material was almost entirely done away with. It would be difficult to find a more valuable improvement.

After using one for many years, the payment of a royalty might seem a hardship. But its justice will appear when it is remembered that but for such an invention every well in the country would be a dug or a drilled one, both involving much expense. If the saving to the people at large that it has effected could be computed, it would reach many millions of dollars. If one-tenth of this amount were collected as royalties, the owners of the Green patent would receive a princely sum. Owing to the wide and individual use of the drive well, it is safe to say that but a small fraction of royalties really due will ever be collected.

The favorable treatment of the patent by the Supreme Court, it is fair to assume, was caused by some such considerations. That tribunal is at liberty, and is obliged in many cases, to take cognizance of just such views as we have presented, in order to determine the originality of an invention, and the consequent extent of its claims. Utility and the revolution the invention effects in human industries are legal bases for judgment on the scope of patents.

How the Inter-state Commerce Bill Works.

One of the first complaints presented against the Inter-state Commerce bill came from the wool interest in California. It asked for a suspension of the long and short haul clause, in respect to wool shipments from that quarter, on the ground that, under the law, wool export from California to the East would be nearly, if not quite, impossible. Against this concession some of the wool merchants hereabouts have strongly protested. They have showed that in the past wool has been brought east from the Pacific coast for from fifty to sixty cents a hundred pounds, while the rate from points very much farther east has been as high as from \$3.00 to \$4.50 a hundred pounds. This is precisely what the law was intended to stop, and suspension of the operation of the law, for the purpose of permitting it to continue, would be defiant of the very intent and spirit of the act.

The Pacific railroads were built largely with public money; they were constructed at the cost of every citizen, not for the sole benefit of the people of the Pacific coast, but for the advantage of the entire body of people in every part of the country. For these corporations, possessing such advantages and clothed with such privileges, to use their power to injure—perhaps to ruin—the business of one class of individuals for the purpose of benefiting another class, is a shameless outrage which the government was required by the most ordinary considerations of decency and justice to suppress. These corporations have for years played into the hands of a sugar monopoly, which has robbed the people of California, and they have persistently favored certain interests, like this wool interest, at the cost of others. The new law puts its foot on such transactions. It makes compulsory something like fair dealing. California may, even yet, get as low a rate to Philadelphia for wool as Ohio gets, but to demand the sanction of the commission for a rate only one-sixth as great as Ohio has to pay is both audacious and impudent.—Textile Record.

Own Your Own Homes.

Every man, whether he is a workman in the common acceptance of the word or not, feels a deep interest in the management of the affairs of the city, county, and State in which he lives whenever he owns a home. He is more patriotic, aptly says our worthy contemporary, the Industrial Gazette, and in many ways is a better citizen than the man who simply rents, and who has but little if any assurance of how long it will be before he can be ordered to move; to which may be added in many cases the saving of more money. Of course it requires some economy to lay up a sufficient amount of money to purchase and pay for a home; but this very fact, if properly carried out after the home is acquired, may be the instrument of furnishing the means to commence and prosecute a business upon your own responsibility. True, in some cases it will require more economy, perhaps, than we are now practicing. But the question with every man, and especially if he is the head of a family, is, Can he afford it? That is, can he afford to live up his wages as fast as he earns them, without laying up anything for the future? If he is the head of a family, he is obliged to pay rent, and it does not require very many years of rent paying to make up an amount sufficient to purchase and pay for a comfortable home. You have to pay the rent. This you say you cannot avoid and be honest. Well, you cannot be honest with your family unless you make a reasonable attempt to provide them a home of their own in case anything should happen to you. And the obligation to do this should be as strong as the one to pay rent or provide the other necessities for the comfort of your family. When you own a home, you feel a direct interest in public affairs that otherwise you might consider were of little interest.

Pneumatic Letter Tubes.

Recently in the House of Commons Mr. Henniker Heaton asked the Postmaster-General whether he was aware that in Paris cartes telegraphiques similar to post cards are issued of various values, inclusive of reply cards, which are collected every five minutes from special boxes and transmitted by pneumatic tubes to the general post office, and whether he would consider the advisability of introducing this system into London and other large towns. Mr. Raikes said: "I am aware that in Paris, as also in Berlin and Vienna, there are systems of pneumatic tubes, by means of which letters, telegrams, and cartes telegraphiques are distributed. The question of adopting a system in London has been considered by my predecessors in office, and they came to the conclusion that it was not desirable, either in the interests of the public or of the post office, to establish it." The predecessors in office never have of themselves concluded that any new thing was desirable. They objected to everything, including the 6d. telegrams, which have proved a great success in every way. In Berlin, people have been able for years to send letter messages by about an hourly delivery by pneumatic post for 3d. In London we have to pay 6d. at least for a few-word telegram not much quicker.

Many Items of Interest.

Fire and Water says that Horace Loomis, engineer of sewers, is building at Pier 29, East River, New York City, an outlet sewer of creosoted yellow pine. The sewer is circular, 4 feet in diameter and 541 feet long. The staves are 4 inches thick, placed radially, and are secured by galvanized iron hoops, $3 \times \frac{3}{8}$ inch, tightened by two bolts passing through shoulders on the semi-hoops. The hoops are spaced about 4 feet apart, and the sections of the sewer butt squarely, the joint being covered by an $8 \times \frac{3}{8}$ inch hoop. This sewer is supported upon caps bolted to the piles of the wharf previously in place, the joints of abutting sections being made to rest upon these caps.

Some system of constant artificial ventilation for sewers is, in the opinion of some of the most competent authorities, absolutely necessary, if we would be thoroughly rid of the deadly pest of sewer gas. Alanson Sibley, for ten years a member of the Detroit Board of Sewer Commissioners, advocates for this purpose a furnace and chimney of strong draught, at the mouth of the main sewer, to create a constant suction of the gases away from the houses and into a consuming chamber in the furnace.

Employing natural gas to advantage has been put in practice at Pittsburg, Pa., where at each of the fire cisterns the gas mains have been so arranged as to enable the department to connect a small hose to them, leading to the grate bars of the fire engines, when the gas is ignited and the engines kept running by it. By this means it has been found that at time of fire the engine can be fired with gas alone at a greatly reduced cost, and it is said that the supply and fuel wagons are to be dispensed with. Each cistern is provided with four connections.

Coal ashes are of some value as a fertilizer, especially to mix with clayey soil. But the best use to make of the ashes is for roads and paths. A good covering, over which a little soil is thrown, will soon form a hard, solid road. To make a better walk, prepare and level the bed, excavating it a few inches below the general surface. Pour on a coating of coal tar and cover it thickly with coal ashes. When this is dry, repeat with another coat of tar and ashes, and so on, until there are four coats of tar and as many of ashes. This, in a short time, will harden and make a walk as hard as stone.

A contemporary says of F. A. Sinclair's "Common Sense chairs," made at Mottville, N. Y., that they will hold together under the heaviest weight and the roughest treatment, and his rockers would almost make an old lady forget her rheumatics.

All elevators in buildings should be bricked in, or the sides of the well hole covered with metal plates, asbestos sheets, or some other non-inflammable material, to render them fireproof, and laws should be enacted making it compulsory on builders and property owners to make such provision for the safety of life and property.

But in buildings where no such provision is made, the following device has been suggested for preventing the spread of fire by way of the elevator shaft: It is proposed to erect a standpipe in one corner of the shaft with branches of perforated pipe, of smaller size, surrounding the well at each floor. The water can be turned into each of these perforated pipes simultaneously by pulling a lever at a point remote from the elevator, thus filling the shaft with a shower of spray, which will be likely to subdue the flame, unless the draught is very great and the fire too far progressed.

In several places in Dakota the artesian wells of 900 to 1,050 feet show pressures of 250 to 325 pounds. As there are no elevations within hundreds of miles to correspond to this, the *Chicago Journal of Commerce* asks the geologists, gasologists, or seismologists to tell what causes the pressure. Is it confined gas?

Statistics show that about twenty thousand people are annually destroyed in India by animals, and of these, nineteen out of twenty are said to be bitten by snakes. The number of human victims tends to increase, in spite of the fact that the number of wild beasts and snakes destroyed has doubled in the last ten years, and that the government reward paid for their extermination has risen proportionately. Next to venomous reptiles, tigers claim most victims. Ten years ago, wolves, mostly in the northwest provinces and Oudh, killed five times as many people as of late years; but the extermination of wolves seems to be going on rapidly. Leopards are the alleged cause of death to about two hundred human beings annually. Apart from the loss of human life, the returns show an annual destruction of fifty thousand head of cattle.

The work of converting the Washington Navy Yard into a gun foundry, authorized by the last Congress, has been commenced. Operations at present are confined to the old anchor shop, where the former appli-

ances are being removed preparatory to its being fitted up for the construction of guns of 8 inch caliber and under. The floor will be concreted, lathe foundation erected, boilers and other improvements put in, and a foundation made for the 40 ton traveling crane to be erected for the handling of the guns. Draughtsmen are engaged on plans for the construction of a wing to the anchor shop for the manufacture of large guns of a caliber of 10 inches and upward. This building will be higher than the old anchor shop, as it is intended that the 110 ton crane to be used in the construction of the large guns shall have a hoisting height of 40 feet. But, adds the *Army and Navy Register*, it will be many months before the gun foundry is in full working order.

The following lines from *Power and Transmission* set forth pretty clearly the difference between a class of business as now conducted and gambling:

You go upon the board of trade,
Where margin merchants meet,
And take some little options
On January wheat;
You watch the little ticker,
Till the hands swing round the ring,
Then you find your little boodle
Has gone a-glimmering.
That's business.

You go into a faro bank
And buy a stack of chips,
And watch the cards come from the box
Which the dealer deftly flips,
When your head is dull and aching,
At the breaking of the day,
You see that fickle fortune
Has gone the other way.
That's gambling.

Careful experiments on the sense of smell in dogs have been made by George J. Romanes, who has communicated the results to the Linnean Society of London. He finds that not only the feet, but the whole body of a man exhale a peculiar or individual odor, which a dog can recognize as that of his master amid a crowd of other persons; that the individual quality of this odor can be recognized at great distances to windward, or in calm weather at great distances in any direction; and that even powerful perfumes may not overcome this odor. Yet a single sheet of brown paper, when stepped upon instead of the ground, and afterward removed, was sufficient to prevent Mr. Romanes's dog from following his trail.

Alkaline Varnish for Gelatine Negatives.

The *Br. Jour. of Photo.* says: Shellac, either bleached or unbleached, dissolves with great readiness in solution of borax or the alkaline carbonates, and when the solution thus formed is evaporated to dryness the residue is said, though not with perfect truth, to be insoluble. At any rate, it is sufficiently so to make a useful "waterproof" protective varnish for many purposes when the alkali is not an objection.

We have recently been experimenting with solutions of this character applied to gelatine negatives, and we are inclined to believe that, though perhaps not forming a practically perfect protection, such as we have indicated, they are likely to be used with advantage. The aqueous lac varnish is, as may readily be supposed, not so durable by a long way as the alcoholic, especially when applied to glass or other impervious substances; but our experience with it is that, when applied to paper or other surfaces capable of absorbing it, it forms a much tougher protection than the alcoholic solution when maintained on the surface. Thus, a gelatine negative varnished with aqueous solution of bleached lac presents a harder and less easily scratched surface than one protected by an alcoholic varnish of unbleached lac, the latter being itself naturally harder in the unbleached state. In the one case the lac is absorbed into the film of gelatine, in the other it is not; and though the first—the lac-impregnated film—is not waterproofed, or rendered non-absorptive, it is within certain bounds, dependent upon the strength of the varnish, capable of swelling and contracting under the influence of moisture without cracking in the manner an alcoholic-varnished film will do.

The solution we have found to answer best, after trying various combinations and strengths, is composed as follows:

Bleached lac.....	2 ounces.
Borax	$\frac{1}{2}$ ounce.
Carbonate of soda.....	1 drachm.
Glycerine.....	.30 minims to 1 "
Water	20 fluid ounces.

Dissolve the borax and carbonate of soda in ten ounces of hot water, and throw in the lac broken into small pieces; place the containing vessel upon a clear fire or over a gas stove, and stir until the lac is dissolved.

When dissolved, allow it to cool partially, and filter through filter paper, after which the glycerine is added and the bulk made up to twenty ounces. Though now apparently perfectly clear, if it be set aside for a few days a sediment will be thrown down, when it may be again filtered, and then comes off beautifully bright and of a light amber color.

To use this varnish, the negative is finished, washed, and dried in the ordinary manner. It is then carefully dusted and either immersed in the varnish in a dish or the varnish is poured on to it and allowed to soak in for about a minute, after which the plate is closely drained. Under the action of the varnish the gelatine swells and absorbs the dissolved shellac, which, penetrating the film, renders a thick surface layer unnecessary. Indeed, it is preferable to drain as closely as possible. In two or three minutes the moisture will have been completely absorbed, and the surface of the negative takes a smooth, glassy appearance, showing the image in very slight relief. In the course of half an hour, at ordinary temperatures, the varnish will have dried to a perfectly smooth and beautifully even surface, resembling glass itself, and presenting extreme hardness to the touch. If a thicker solution be employed than the one given, the result is not so satisfactory.

If the film so varnished be plunged into water, it will swell just as if unvarnished; but if set aside to dry spontaneously, it will do so with perfect uniformity, and without any of the cracking so well known in connection with an alcoholic varnish. If heat be employed, or if the solution be stronger than that given, cracking will most probably occur.

Though this appears to form an extremely tough and promising protection, we are unable to speak as to its actual durability as yet. A second coating, however, of thin alcoholic lac varnish, or of collodion, would seem to offer an additional amount of permanency if the alkaline lac should show any tendency to deterioration.

Liquefaction of Gases.

A highly interesting series of experiments on the permanent gases has recently been successfully carried out by M. Olszewski. The more permanent gases have not only been liquefied at pressures averaging only 740 mm. by aid of excessively low temperatures, but the boiling points, melting points, and densities of these so-called gases have been determined at atmospheric pressure. The glass tube in which the condensation was effected was surrounded by a bath of liquefied ethylene, which could be caused to boil by reduction of its pressure, and, by use of a specially constructed air pump, was reduced in temperature to -150 deg. C. When this point was reached, the gas to be liquefied was admitted into the tube from a Natterer cylinder containing the gas at about 40-60 atmospheres pressure, and was readily liquefied. A hydrogen thermometer was used to determine the temperature of the liquid, and the boiling point of methane at atmospheric pressure was found to be -164 deg. C., that of oxygen -181.4 deg., nitrogen -194.4 deg., carbon monoxide -190 deg., and nitric oxide -153.6 deg. The melting point of carbon monoxide was also determined to be -207 deg., and that of nitrogen as low as -214 deg. M. Olszewski's nearest approach to absolute zero was -225 deg. for solid nitrogen. The density of methane at 736 mm. and -164 deg. was found to be 0.415, that of oxygen at 743 mm. and -181.4 deg. was 1.124, while that of nitrogen at 741 mm. and -194.4 deg. was found to be 0.885. The densities were determined—*Nature* says—by reading off the position of the liquid meniscus in the tube, volatilizing a portion by means of an aspirator, and again reading off the height of the column, the volume of the volatilized portion being measured by the amount of water running out of the aspirator.

J. B. Obernetter.

J. B. Obernetter, universally known as the inventor of many different and highly interesting photo-mechanical processes, died in Munich, Bavaria, during the night of April 12th last. For more than twenty-five years Obernetter directed his remarkable powers of study and observation to the art of photography. It was he who in 1864, while employed as chemist by Joseph Albert, of Munich, discovered and explained the method of photo-printing without the use of silver salts. Besides a positive paper, he invented several valuable and lasting improvements in the lichtdruck-gelatine process. His lichtdruck establishment is one of the largest in Europe. Hand presses alone are used in it, but the work executed is acknowledged to be equal, if not superior, to any other of a similar kind done throughout the world.

Obernetter's own life work will undoubtedly form the fittest and most enduring monument to his memory.

The Continental Iron Works.

Thomas F. Rowland, of Brooklyn, N. Y., has merged his business, generally known as the Continental Works, into an incorporated concern under the title of Continental Iron Works, which will continue the manufacture of gas holders and heavy special machinery as heretofore. The officers of the new company are: Thos. F. Rowland, president; Warren E. Hill and Chas. H. Corbett, vice-presidents; and Thos. F. Rowland, Jr., secretary and treasurer. The works in Brooklyn cover about four acres of land on the river front, and are the most extensive in the vicinity of New York.