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**EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.**

There seems to be an impression among inventors that, since the law of March 4, 1861, went into force the previous law in respect to extending patents for seven years was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1848 and 1849 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension; it must be done at the instance of the inventor, for whose sole benefit it is granted.

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MUNN & Co.,  
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**THE BEST GUN.**

As the uncertain position of our foreign relations will probably arouse Congress to adopt the measure so long urged by the officers of our engineer corps—the providing of very heavy guns for our sea-coast fortifications—and, as the measure will involve a very large expenditure, it is important that the best gun known at the present time should be adopted. It seems to us that by selecting the valuable features of the several inventions which are presented, a gun may be formed better than any that has yet been made. There are three kinds of cannon now in use in our service, each of which has some advantages peculiar to itself, and we do not see why all of the advantages cannot be combined in a single gun.

The Rodman gun, made of cast iron which is cooled by a current of water circulating through the core, has advantages of strength and durability manifest to theory, and that have been most conclusively confirmed by experience.

The Parrott gun, formed by reinforcing a cast-iron core with hoops of wrought iron, has the same theoretical advantage as the Rodman gun, with the superiority of greater tensile strength in the exterior hoops.

Dahlgren's last plan, of casting the gun without trunnions, and securing these to the piece by hoops and breech bands, obviates the serious objection of angles and corners in cast-iron cannon.

Now, why would it not be wise for the Ordnance Department of our army to try a gun cast hollow by Rodman's method, but without trunnions on Dahlgren's plan, and then to reinforce the breech with hoops coiled and welded on Parrott's system? It may be that the wrought-iron hoops will receive a permanent set from the momentary expansion of the core

at the instant of discharge, or the several systems may be in some way incompatible with each other, and the Department would, of course, have a few guns thoroughly tested before proceeding to construct the many hundreds that will be required for all of our forts. We throw out the suggestion, having confidence from the previous history of the Department that no prejudices will prevent the adoption of any invention, either domestic or foreign, which will tend to promote the efficiency of our artillery.

**PROPOSED AMENDMENTS TO THE CANADA PATENT LAW SYSTEM.**

A bill is now pending before the Canadian Parliament for the protection of British and foreign patentees, and to encourage arts and manufacturers. It contains liberal and enlightened provisions, and should it become a law it will relieve our provincial neighbors of the charge of illiberality toward inventors of other nations. As the Canadian statutes now stand a person in order to secure a patent must be a resident subject and the inventor of that for which the patent is sought; thus effectually closing the door against all foreigners, without distinction, and leaving Canadian subjects free to appropriate whatever they can lay hands on from the inventors of other countries. The injustice of this system is plainly manifest, and very naturally soured our inventors against their unreciprocal neighbors. The bill now before us is designed to sweep away this unjust system. It provides that any person, or the assignee of any person, who has obtained a patent for an invention in Great Britain, or the United States, or any foreign country, for a new and useful invention or composition of matter, shall, upon the production of the proper papers, be entitled to Letters Patent in the Canadas, which shall remain in force until their expiration in the foreign country where previously obtained. The fee to be required is thirty dollars. We cannot conjure up a single good reason why this bill should not become a law without delay or opposition, and we trust its mover, Hon. Mr. Moore, will not flinch in urging its speedy passage.

By the act of March 2, 1861, our patent laws were amended so as to place inventors of every nationality on the same footing as to fees with our own citizens, except such countries as discriminate against us. This virtually shuts out Canadians—unless they pay a fee of \$500—simply because they discriminate against us. If it is assumed by the opponents of this reform that the old system is best, because it leaves resident subjects free to patent whatever they may chance to discover themselves, and also to roam through the domains of foreign science and arts, we reply that the argument is unsound, and has so proved in the history of the Canadian Provinces. It is also dishonest, as it evinces a desire to take and use that which properly belongs to another; and thus encourages a species of piracy which our neighbors would not wish to have practiced upon themselves.

It may be true that some comparatively insignificant improvements may have found their way to the Provinces from the States, but we have yet to learn that a single valuable improvement patented here has been manufactured there. Our enterprising inventors and manufacturers want protection for their discoveries, and until that is tendered to them they will not strive to introduce their improvements against the probability of a future open competition.

We fear this bill will fail, but we hope not, and we urge upon Canadian legislators not to ignore this wholesome reform, but to hurry it forward to a wise consummation.

**THE GREAT TROY FIRE—IRON SAFES DESTROYED.**

Our readers are aware that the enterprising city of Troy has recently been visited with a most destructive conflagration. It burned over from fifty to seventy-five acres of ground, and consumed, in its ravages, upward of \$3,000,000 worth of property. Bankers, merchants and housekeepers have hitherto been accustomed to trust their valuables to the custody of iron safes, but it now appears that too much reliance should not be placed upon the perfect fire-proof qualities of these safes. A valued correspondent, residing in Troy, who is fully conversant with the scientific facts in the case, writes us as follows on the

subject:—"The fire was one of the largest that has ever occurred on this continent, and, allow me to advise you, as you are in the habit of keeping valuable papers in your safe, not to be too confident in the protection which it affords. Hardly a safe standing out unclosed by brick has passed through the fiery ordeal. Troy is, as you know, a great place for manufacturing safes, and the thing is being hushed up and kept out of the newspapers, but the fact is, the safes standing isolated in a building are little protection. I have seen three opened within a day or two, and none of them had a paper legible inside. The wood work was pretty much all burned up—one safe, which I did not see, was opened before it had got perfectly cool, and the owners had the satisfaction of seeing the charred contents entirely burn up upon the admission of air. The fact is the safe makers have departed from the original idea of filling the safe with plaster of Paris, which is the only thing which will answer as protection. The value of this is shown by the fact that you cannot boil water in a tin pan, thinly coated with plaster, over a hot fire."

**GENERAL TOTTEN ON THE SHIP AND FORT QUESTION.**

General Totten, who is at the head of the Engineer Corps of the United States Army, and who is as competent to give an opinion on the subject as any person in the world, has just given a brief statement of the present relations of ships to land fortifications. It will be seen that his positions are precisely the same as those taken by the SCIENTIFIC AMERICAN, the *London Quarterly Review*, and all European and American engineers who have kept informed in regard to the subject. Our military engineers have been urging the department for years to provide guns of much larger caliber for our sea-coast fortifications, and we trust that recent events will stimulate Congress to delay no longer this measure of vital necessity. It was probably fortunate that the step had not been taken before this rebellion, as it is owing to their feeble armament that we are enabled to recapture the fortresses seized by the rebels; but in order to hold them against both domestic traitors and foreign foes they ought to be armed immediately with a 15 or 20-inch gun at every embrasure.

General Totten states the principles which have been established by experience, and these furnish a safe guide and firm basis for inventors seeking to devise further improvements.

The following are General Totten's positions:—

1. That the plans of our seaboard batteries are of the simplest character and cannot possibly be improved.
2. That the materials being the strongest, most indestructible, imperishable and cheapest possible, no change can be made in them with advantage.
3. That iron has been freely used for years past to guard the thinnest and most exposed part of these batteries, and its further use is perfectly easy on the existing works to any extent, and is a question of economy merely; it will be applied whenever needed; the walls may be entirely iron covered.
4. That all the changes in ordnance and projectiles are greatly in favor of land batteries, and against vessels, in any combat between the two.
5. That guns of unlimited size can easily be mounted and covered on land.
6. That no vessel can be built and floated that will not be penetrable to projectiles from such guns.
7. That one shot, rightly delivered, will probably sink the vessel, while the fort cannot be seriously injured by the return fire of the vessel.
8. That the methods of naval warfare cannot avail in such a contest.
9. That all the best results of modern science, skill and experience are incorporated with these defences as soon as these results are found to be reliable.
10. That while forts can now, as always heretofore, be readily reduced by land batteries, they cannot be reduced when duly armed and manned, by vessels.
11. That the use of steam is a very great and the only exclusive advantage which modern times has afforded to vessels.
12. That this advantage can be countervailed only by increasing the number and especially the caliber of the guns of the land batteries.
13. That the need for a full supply of guns for our forts is very great. The want of them is dangerous.

11. That large calibers are insisted upon, and to be furnished immediately.

It is not intended, by what has been said, to dispense with the employment of floating defences for our coast at the different points where their use is advantageous.

#### THE WAY THE GOLD DEPOSITS OF CALIFORNIA WERE FORMED.

Lawson B. Patterson went to California early in 1849, and he has spent 12 years in mining, never having diverted his labor to other pursuits, and never having come down from the mountains until September last. Having become satisfied that the usual explanations given by geologists of the formation of the gold deposits are unsound, he has written a little book of 100 pages to publish his own ideas. Before proceeding to examine Mr. Patterson's positions, let us give as briefly as possible the usual explanations of the geologists.

If a grain of sand, equal in diameter to the thickness of four sheets of paper like this on which the *SCIENTIFIC AMERICAN* is printed, is laid upon a 16 inch globe, it will bear the same proportion in height to the size of the globe that the Himalaya mountains bear to the size of the earth. The mountains and valleys, therefore, of the earth form very slight wrinkles in its surface. It is supposed that the interior of the earth is a molten mass: the solid crust of the surface not bearing so large a proportion to the whole, as an egg shell does to the whole egg. As the earth cools, it contracts in size, and the crust settles in upon the shrinking mass. This settling in is not uniform all over the globe, but large tracts go down; heaving up the rocky crust around them sufficiently to form those slight wrinkles which constitute the mountain ranges and ocean valleys that seem so vast to us—the pigmy crawlers upon this whirling ball.

These changes in the surface of the earth are constantly going on, but very slowly. The coast of New Jersey has settled some four feet in the last 80 years; a portion of Sweden is rising at the rate of about one foot in a century, this movement having raised that country about 800 feet; while the bottom of the Pacific ocean is slowly going down.

Now there was a time, inconceivably remote as we count time, but comparatively recent in the vast periods of geology, when the rocks that now form the Sierra Nevada mountains and the rest of California were buried beneath the waves of the Pacific Ocean. These rocks were traversed then as now by veins of quartz, some of which contained gold. How the veins of quartz were formed, and why the gold should be collected in them, we do not propose now to consider, though it has been made the subject of profound inquiry by the ablest geological chemist in the world. The changes that have subsequently taken place are more than sufficient for a single article.

As the middle portion of the bed of the Pacific subsided, the rocks near the coast were heaved up, and thus California rose, like Venus, from the sea. Extensive, laborious and minute examinations of the surface of California, by geologists trained to the difficult art of observation, have shown that the country was raised by successive periods of upheaval: between which were long intervals of repose. In ascending the slope of the Sierra Nevada, terraces are found one above another which unquestionably form a successive and widely-separated ages, the shore of the Pacific. As the rigid rocks were tilted up, they were cracked and broken; opening long channels, into which the water from the copious rains was collected, forming the rivers that flow down the slope of the mountain. At first these channels had ragged bottoms and sides, but the flow of water for centuries has worn them smooth. It has also worn them deeper, and the depth to which its ceaseless attrition has cut into the solid rock is one of the most impressive proofs that we have of the immense periods that have passed since rain first began to run in these ways.

Whenever a gold-bearing vein of quartz chanced to be broken by the upheaval or worn by the stream, a deposit of gold would be formed. Of course the formations of the several deposits would be influenced by an endless variety of circumstances. In some places the rocks would be worn by the rivers, in others by the heaving of the sea. Basins would exist in

which the water for thousands of years would tumble the debris of the mountains, shaking down the gold to the bottom. Then as these basins were lifted above the sea, they would become ponds to be slowly filled up by the growth of vegetation. The river channels and the basins are the "long toms" and "pans" in which nature carries on her mining operations; collecting the gold upon the ripple bars, and washing away the "tailings" to the sea.

Mr. Patterson cites in opposition to this theory two facts, one of which at first view seems to have a great deal of force, while the other seems to be in perfect accordance with the theory. He says that at Cement Hill the basin in which the gold occurs has a complete rocky boundary, so that no stream could have flowed through it. But no geologist supposes that streams ever did flow out of the bottoms of these basins. Mr. Blake, in a passage cited in Mr. Patterson's book, ranks Cement Hill among the lacustrine deposits, that is, deposits formed in lakes or ponds.

But the other objection of Mr. Patterson seems to have more weight; this is that the rocks of the river banks are not worn smooth as they would be had they been cut through by the action of water. We have no doubt, however, that a more extensive observation will convince our author of the unsoundness of this objection. If he examines a water cut channel, like that in the Niagara river below the falls, he will see that the rock is undermined and broken, so that a face once smooth becomes ragged, while he will discover that wherever the ledge on the sides of the California streams is protected by a layer of clay and gravel it bears unmistakable evidences of having been worn smooth by the action of water.

Mr. Patterson's book contains some excellent practical advice to miners, and will be found richly worth its cost to all California seekers of gold. It may be purchased by sending 50 cents to the author at Boston, Mass.

#### PATENT LAW REFORM IN NEW BRUNSWICK.

We have advices from an attorney residing in St. Johns, New Brunswick, that at the last session of the Provincial legislature, which was prorogued a few days since, an act was passed amending the patent laws so as to allow citizens of the United States to obtain patents in that province. The law, previous to the act referred to, discriminated against all non-residents, hence our law of March 2, 1861, discriminated against residents of New Brunswick. We are happy to chronicle this excellent change in the spirit and letter of the law. It is in entire consonance with the spirit of progress which should mark the history of all nations. The benefits conferred upon mankind by inventions in the arts and sciences are universal, and their authors deserve universal recognition. The people of New Brunswick are among the most vigorous, enterprising and intelligent in all the British Colonies. A large number of ships are annually built in New Brunswick. Population about 200,000. This is an excellent opening for our inventors. For particulars about the practice under the law parties can apply at this office.

#### Successful Opening of the Great Exhibition—Defective Building.

The *London Engineer*, of May 2d, says:

The successful opening of the International Exhibition is a subject for gratulation. An undertaking which has aroused so much interest and no little anxiety deserves success, and nothing could be more auspicious than the opening ceremony yesterday. Whatever may be the comparisons made between the present exhibition and that of 1851, the public are manifestly preparing to come in millions, and they will certainly not be disappointed in the materials for valuable observation, whatever they may think of the general effect of the whole.

We think every engineer who has examined the structure of the building must now feel that one critical test of its strength is well over. The building is not over and above strong. It was planned by a gentleman who has exhibited the most intrepid defiance of some of the first principles of construction, his neglect to provide, in his original plans, for the outward thrust of the arches, being one example in point. Before the contractors, acting upon the ready suggestions of Mr. R. M. Ordish, had supplied extra

diagonal tension rods, the main columns of the nave had gone out of plumb, and in the western annexe the visitor can still see the results of the same contempt of abutments, the wooden posts being from 12 to 16 inches out of plumb in a height of 28 feet, the whole being held up by props in the Prince-Albert road. So, too, the breaking weight of the gallery girders is given as only 88 tons, while it is possible to accumulate upward of 35 tons of moving load upon them. The assigned breaking weight is, we take it for granted, the distributed breaking weight, which is twice that required as a central breaking weight. We have less fear of failure by actual overloading, however, than by buckling, or the settling of one or more of the detached brickwork piers, or the fracture of one or more of the weak lugs to which the diagonal tension rods are secured. For those who care to go through the details of the construction of the exhibition building, we may refer to the *Engineer*, Vol. XII., page 354, or to still more complete information in the current number of the *Practical Mechanics' Journal*. Few, however, we apprehend, care to spend much time in studying a notoriously imperfect model, as the building in question is—imperfect in construction as well as in architectural design. We allude to its defects chiefly for the purpose of expressing the hope that those having charge of the building will exercise every care to guard against a catastrophe, by frequently testing the truth of the columns, and watching the deflection of the gallery girders. With this we may dismiss the building, merely remarking that no curiosity on the part of a stranger to see it on the spot is likely to be rewarded by a single emotion when he arrives at South Kensington. But the contents of the building will quite atone for other defects, and to many objects the visitor will feel he can hardly return too often. In engineering and mechanical interests, especially, the display far surpasses anything of the kind ever attempted before. The machinery department, too, is the most advanced of any in the exhibition, and this fact, all who have looked into the annexe will say, reflects great credit upon Mr. D. K. Clark, the untiring superintendent of classes 5, 7, 8 and 10. Mr. Clark first assumed the duties of this post in June last, and since October he has given his whole time to it, with a success to which every visitor will bear testimony.

The western annexe is likely to be intolerably hot. With nearly two acres of glass roof, at a low elevation, and more especially with upward of a mile in length of steam and exhaust pipes ranging from 8 inches to 18 inches in diameter, and lying but a short distance beneath the floor, the temperature after St. Swithin's may be conjectured. Almost the only danger from fire, in this portion of the exhibition, would be, one would suppose, from spontaneous combustion, and we do not doubt that ample precautions will be taken to prevent any outbreak from this cause. The value of all the goods in the whole exhibition has been roughly estimated at £4,000,000, of which a large portion must be included in the annexes, almost too fragile to hold themselves upright. There must be, at least, £100,000 worth of marine engines in the building, and hardly less than £50,000 worth of locomotives. Mr. Clark has, in all, about 700 exhibitors in the classes under his superintendence, and we should suppose the average value exhibited by each was quite £1,000.

The *London Engineer* says, the floating battery *Trusty*, fitted some time ago with Captain Cole's cupola shield for experimental purposes, has been refitted at Woolwich with the plates, seven in number, which were uninjured in the subsequent trial at Shoeburyness. The shield is again ready for the second trial, and will be fired at from Sir William Armstrong's heavy ordnance. The damaged plates, five in number, have not been replaced, but their vacancies have been filled with oak planks, and the interior of the cupola has been shored up with solid balks of timber, to render the shield as irresistible a target as 4½-inch slabs of wrought iron over a breast-work of oak can possibly supply. In the forthcoming experiments the shield is not intended to revolve, but will be fired at on one side only.

A DAILY direct train service commenced, on the 6th of May, between Berlin and St. Petersburg. A through train is also about to be established daily between Paris and St. Petersburg!