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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 pattents, 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.

For full particulars concerning extension, address

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THE LAST PHASE OF THE ARMSTRONG GUN.

One of the most bewildering tasks that has ever fallen to our lot has been to keep track of the various modifications in the Armstrong gun. It commenced its career as a very complicated breech-loading rifled cannon, made on Prof. Treadwell's plan of hooping with wrought iron. After undergoing various modifications in its details, it next appeared with some mysterious peculiarity which caused it to be called a "Shunt gun." By the last arrival from England we learn it is now made with a *smooth bore to be loaded at the muzzle with spherical shot*, with no material peculiarity to distinguish it from any of that large class of cannon which are reinforced with hoops of wrought iron. In other words, Sir William Armstrong has laid aside his gun, and is making the old-fashioned kind of cannon.

This is an interesting fact in the history of gunnery, but the social and political facts connected with it are far more interesting. It is known that the English government has conferred the honor of knighthood upon Armstrong as a reward for his great invention, and more than $15,000,000 have been expended for the guns which have now been laid aside for the old-fashioned cannon. Notwithstanding this public abandonment of his invention, the pompous and pretentious English government, with its House of Noble Lords and its Honorable House of Commons, deliberately and intentionally swallows the imposition, and the great London *Times*, "the foremost paper of the world," "the Thunderer," gravely calls this smooth-bored muzzle-loader "the Armstrong gun!" Verily, it is an age of humbug.

THE deficit of the British revenue last year amounted to $5,500,000.

THE EXCITEMENT IN RELATION TO IRON-PLATED SHIPS.

To a person who has kept even moderately informed in regard to the experiments on iron plates, there is something amusing in the excitement caused by the fight between the *Merrimac* and *Monitor*. That action showed the power of certain kinds of plates to resist certain kinds of shot fired from certain kinds of guns with certain charges of powder, but did not show what would be the result, when any of these conditions were materially changed. The idea that it settled the whole question of the invulnerability of iron-plated ships is ridiculous, and the assumption that it showed harbor fortifications to be worthless is more ridiculous still.

In the first place neither the *Merrimac* nor the *Monitor* was furnished with the heaviest artillery which is manufactured at our arsenals, and which has been proved to be practically safe and serviceable. The *Monitor* had 11-inch guns firing shells weighing 169 lbs. and it is stated that the charge was 12 lbs. of powder. Now Rodman's 15-inch gun has been fired more than 500 times, with shells ranging from 315 to 330 lbs. in weight, and with charges of powder ranging from 35 to 50 lbs. giving initial velocities to the projectile varying from 902 to 1,328 feet per second. What the effect of such a missile would be upon iron plates cannot be even conjectured, plausibly, from the results of the firing on board the *Monitor*.

But this is not all. The 15-inch gun has not yet been half tested. It was so entirely uninjured by the 500 rounds, that experienced artillerists have no doubt that it will bear far higher charges. Capt. Rodman says in his official report:—

It is also certain that much higher velocities, and much greater ranges than any yet reached with this gun, may be safely attained, as I have the utmost confidence in its ability to endure 1,000 rounds with charges giving a maximum pressure of gas double as great as the greatest to which it has yet been subjected.

When the 15-inch gun has developed its full power, if it is not found sufficient to crush in the sides of iron-plated ships, then will come forth the 20-inch gun described on page 182 of our current volume, and its globe of cast iron, weighing half a tun, will be hurled out with a velocity almost the maximum that is ever attained by artillery, and far higher than is ever given to elongated projectiles.

This 1,000-pound shot is not the most destructive that can be thrown from the monster gun. From the porous character given to large masses of iron in cooling, Capt. Rodman thinks that a shell with a small cavity will be better, even for battering purposes, than a solid shot; so that our missiles having the greatest crushing effect are to be shells, with mines of powder in their midst. This shows more than anything else how perfectly untried is our heaviest ordinance in its effects upon iron plates. If it should prove that shells containing large charges of powder can be driven through the sides of armored ships, the powers of destruction will have a greater supremacy over those of defense than ever before. In that case an iron-plated ship can be sent to the bottom as quickly as any one of the wooden vessels which were destroyed at Sinope.

While the British people and Parliament were hastening to the conclusion that the battle in Hampton Roads had shown land fortifications to be worthless, experiments were in progress at Shoeburyness which were destined to upset this conclusion. Sir William Armstrong was sending 10½-inch spherical shot through targets like the side of the *Warrior* at every fire. But these experiments were not at all needed to prove the value of land fortifications. Many years ago, Gen. Totten, Chief of the Engineer Corps of the United States Army, made a series of experiments to determine what thickness of wrought iron plates would be required to render the face of fortifications invulnerable to projectiles from the heaviest ordnance in use. He decided that eight inches, with a backing of solid masonry, would be sufficient.

If the introduction of heavier ordnance should require a greater thickness of iron plates, it is manifest that this could be placed on earthen foundations more easily than upon structures floating upon water. The size of a floating structure must increase with the thickness of the iron which it supports, but the size is limited by the strength of the material of which the structure is formed; while there is no limit to the thickness of an iron wall which may be built upon a marble or granite ledge.

Nothing has been better settled for several years, among both naval and military engineers, than the worthlessness of wooden ships of war. The fight in Hampton Roads has impressed this truth upon the public, but it has made no more important contribution to the art of naval attack and defense than either one of a considerable number of experiments, and it most certainly has not shown the worthlessness of land fortifications.

SECRETS OF THE BESSEMER PROCESS.

The Bessemer process—so called—consists in blowing air for a very short period through molten pig iron, for the purpose of removing the excess of carbon, by bringing oxygen into contact with it, and producing carbonic acid gas. The process is based upon scientific principles, as it is generally considered that steel contains a somewhat less quantity of carbon than cast iron, and wrought iron is just decarbonized pig metal. The process of Bessemer has been illustrated in former volumes of the SCIENTIFIC AMERICAN, and we need not now repeat further particulars connected with it; our present object is quite different. It is known to us and many others, that Dr. Martien, of Newark, N. J., obtained a patent in England for treating pig iron by the pneumatic process, before Bessemer made an experiment; and Mr. Kelly, another American inventor, antedates him by a considerable period of time. Now it was stated credibly that Bessemer failed to produce uniformly good iron by his method for several years after he commenced operations, but he steadily pursued his object, and at last has attained to such perfection and success that his method is coming into very general use in England. He certainly deserves great credit for his perseverance. On the other hand, what can we say of our more early inventors of the pneumatic process? So far as we know, there is not a single pound of steel or malleable iron made in any establishment in our country by it. Can any reason be given for this? A correspondent of the London *Engineer* lets out the secret. He asserts that the iron produced by the pneumatic process is valueless, and says: "It is now pretty generally known, though the fact has been carefully suppressed by Mr. Bessemer in all his papers, so ostentatiously read before various scientific bodies, that the success of the pneumatic process is solely due to the addition of a metallic compound, consisting essentially of iron and manganese, and containing also carbon and a little silicon to cast iron, after the cast iron has been decarbonized by the pneumatic process." We attach no blame to Mr. Bessemer for keeping this process as secret as possible, but if the statement of the correspondent referred to is correct, his information is a precious boon to American iron manufacturers. We have an abundance of the finest manganese iron ore in the world in our Franklinite for carrying on the Bessemer process, as thus improved.

THE BRITISH IRON-CLAD NAVY.

It is not publicly known how many iron-clad vessels the French have completed, but it is supposed to be no less than from twelve to twenty of the first-class frigates. Louis Napoleon has been quietly preparing an iron-clad fleet for several years. It is the same with England. The late hubbub in the Parliament, and the long discussions in the British papers respecting iron-clad ships and land batteries, have called out much talk from persons who know nothing about what had been done or what was quietly being done by the naval authorities of that country to complete an iron-clad fleet. It is the policy of such governments not to make public all their new military or naval preparations. The British have four iron-clad frigates completed, namely, the *Warrior*, *Black Prince*, *Resistance* and *Defense*. The two former are the largest steam frigates ever built. In addition to these four frigates the following iron-clad frigates are also in the course of construction: the *Achilles*, 50 guns, 6,079 tuns; *Agincourt*, 50 guns, 6,621 tuns; *Northumberland*, 50 guns, 6,621 tuns; *Minotaur*, 50 guns, 6,621 tuns; *Valient*, 32 guns, 4,063 tuns; *Orontes*, 13 guns, 2,812 tuns; *Hector*, 32 guns, 4,063 tuns. These seven vessels will not be completed perhaps before the end of next year, but the following are designed to be finished within 1862: *Caledonia*, 50 guns, 4,045 tuns; *Ocean*, 50 guns, 4,045 tuns; *Prince Consort*, 50 guns,