

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Buildings), New York.

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TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.
Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
See Prospectus on last page. No Traveling Agents employed.

VOL. II., No. 6.....[NEW SERIES.].....Fifteenth Year.

NEW YORK, SATURDAY, FEBRUARY 4, 1860.

RAILROAD SAFETY AND BRAKES.



Every person, when he enters a railroad car as a legal passenger, places his life in the keeping of the company that owns the railroad, and he is perfectly dependent on the power, skill and care of those who are carrying him along on his journey. No higher trust can be imposed upon any company than the safety of human life and property. Every individual employed upon a railroad, from the highest officer to the lowest, should be deeply impressed with the responsibility of his charge, and all of them should work in harmony. To the highest officials belong the duty of making the necessary regulations and providing the means for securing safety; and on the under-officers the duty is imposed of carrying out the orders of their superiors. A culpable failure in either of these links of safety is a public danger and a public crime.

The recent accident on the Hudson River Railroad (noticed in our last number) was one of a very peculiar character, and deserves more than ordinary attention. On this railroad there is a double track, and, in this respect, it is safe from collisions by opposing trains. The accident that occurred was caused by one train running into another on the same track. With good regulations, faithfully executed, no such sad event should have taken place. Now, as safety in traveling is a public question of general interest, the cause of this catastrophe should be scrutinized with just severity. From the evidence elicited before the coroner's jury in regard to Mrs. Field, who lost her life on that occasion, it is perfectly clear that the express train which was run into had a disabled locomotive, and it was long behind time from this cause when it left Sing Sing, at 3.40 P. M.; yet, with a perfect knowledge of this fact, the officers of the after-train started at 3.51 P. M.—only eleven minutes behind it. After running a few miles, the first train was brought to a halt in a very dangerous position (about 700 feet after passing a curve), and where it could not be seen from behind until the turn of the track was reached. It had only been stopped five minutes when the second train came thundering around the curve at a speed of twenty-five miles per hour, and on it went, crushing through the standing one, spreading destruction in its path. The interval of time and space between the two trains was far too short; and as there was no danger to the after-train from any other crowding behind, it was an act of gross recklessness either on the part of the conductor or engineer, to have been running at such a rate of speed around that curve. This point has been clearly made out. But were those who had charge of the first train free from blame? It is related in evidence, that when the train stopped, with a full knowledge of its dangerous position, it was three minutes afterwards before the subordinate brakeman was started back with the red signal flag of danger; also that, although he could have reached the curve in that period of time, he was so slow of motion, and so reckless of danger and duty, that he

had only proceeded 200 feet when the down train came dashing round; and, although the brakes were then put on, and the locomotive reversed by the engineer, the fatal deed was done; these efforts and agencies failed to stop it in a space of 700 feet, and it struck the standing train when moving at a speed of fifteen miles per hour. Here is another point clear. Those connected with the first train were not prompt in doing their duty, so as to run back with the danger-signal whenever their train stopped. Had this been done on the one hand, and the other train been proceeding more slowly on the other, the collision would not have taken place. These conclusions are inevitable from the testimony given in the case. The engineer on the first train may have been able to have gone farther, so as not to stop in such a dangerous position; and we consider there was also mis-management in attempting to run through with such a locomotive, as the train had to stop three times previously on account of its defective steam pipe. These evils or wrongs we have traced to the management of the trains. But there were other means of safety also necessary, and the inquiry naturally arises, was the running train provided with the most important of these, viz., efficient railroad brakes? From the testimony elicited, it appears that it was not. It was fitted with the "Creamer patent brakes," but, although the engineer applied them when 700 feet distant, the speed of the train was only reduced two-fifths when it struck. Is there no brake capable of arresting such a train within a less space than this? There is no subject of greater moment to railroad travelers and companies than an efficient means of destroying the momentum of railroad trains with ease and rapidity. During the past year, twenty-eight experiments were made in England by Wm. Fairbairn, F. R. S., to test two different brakes, and he has reported that a train of 60 tons can be arrested when running at the rate of 20 miles per hour in a space of 72 feet; at 30 miles, in 159 feet; 40 miles, in 282 feet; 50 miles, in 441 feet; and at 60 miles, in a space of 636 feet—which is less than was the distance between the two trains on the Hudson River Railroad when first seen. Creamer's brake is wound-up with a coiled spring, held in place by a clutch, to which is attached a cord; and by drawing this, the engineer throws the line of brakes into instant action. The English brakes referred to were operated in this manner exactly; and yet they proved eight times more efficient. With one of these powerful brakes on the Hudson River Railroad train, it would have been stopped in a space of 100 feet. We certainly require just as efficient brakes on our railroads as they do in England on theirs, and there is no excuse left for not having them. We have inventors and mechanics who can devise and construct railroad brakes of equal, if not superior, efficiency; and to delay longer in securing such upon every railroad train in our country will be a criminal neglect of duty on the part of those who control their management.

PATENT EXTENSION CASES.

The following parties have applied to the Commissioner of Patents for the extension of their patents for a term of seven years:—

Reaping Machine.—Patent granted to Clinton Foster, of St. Francisville, Mo., April 18, 1846. The case is to be heard at the Patent Office on the 2d of April next; the testimony closes on the 19th of March.

Sawmill.—Patent granted to Thomas J. Wells, of New York City, April 11, 1846. The case is to be heard at the Patent Office, March 26; testimony closes on the 12th of March.

Curry Comb.—Patent granted to William Wheeler, of New Britain, Conn., April 25, 1846. The case is to be heard at the Patent Office, April 9; testimony closes March 26.

Persons who wish to oppose the extension of these patents should attend to it without delay. Copies of the claims can be procured of us upon the receipt of \$1 each for copying.

THE NEW COMMISSIONER OF PATENTS.—Ex-Governor Thomas, of Maryland, has been appointed Commissioner of Patents, to fill the vacancy occasioned by the resignation of the Hon. William D. Bishop. It will be about a month before Gov. Thomas will enter upon the important duties of his high office, which, we trust, he will fill to the satisfaction of inventors and the country.

THE NEW CANADIAN PATENT LAW.

Most of our readers are already aware that the present patent laws of Canada are, in some respects, the most illiberal of any that are to be found upon the face of the earth. No person who is a non-resident of that province can legally obtain a patent therein for any invention, however important or useful. It matters not that the applicant is a fellow-subject, unless he has also his home in Canada. The Arkwrights and the Watts, of Great Britain, would have been treated with no more consideration than though they had been subjects of the Emperor of Russia.

This policy of exclusion, though impartial, operates with peculiar severity upon our own inventors. Most of our valuable patents are in substance infringed upon through that medium with entire impunity. Not only are the inventions themselves remorselessly appropriated in that country without compensation to the rightful owner, but the very machines which have been thus taken without leave send back their products under our free rule of reciprocity, in ruinous competition with manufactures made here on machines which have paid a license fee to the inventor; thus operating as a discriminating tariff to that extent against our own mechanics.

We had hoped to see this illiberal policy long since disappear before the light of reason and the march of civilization. In most respects we and our Canadian neighbors are but one people. In language, religion, laws, customs and lineage, we differ from them but little, if any, more than the inhabitants of one State differ from those of any other. The late reciprocity treaty removed the almost sole remaining barrier to our full and perfect brotherhood. Still, the barrier which, of all others, should have been the first to have given way, remains inflexible as yet. All the efforts which, for several years past, have been directed to its removal have been wholly ineffectual, if not nugatory.

It is true that our own law must bear much of the blame of this condition of our relations with our northern neighbors. We allow Canadians, it is true, to obtain patents in the United States; but we charge them a patent fee which is in most cases prohibitory, being more than sixteen times greater than that required from one of our own citizens. This ought never to be, and will not long continue. This provision of our law meets with few or no apologists at home, and has only continued to exist from the fact that, from causes not necessary to be mentioned, all legislation on the subject of patent laws has been postponed from year to year until further delay is becoming impracticable. For the last six years, each annual report of the Commissioner of Patents has urged the removal of all discrimination between native and foreign inventors, and bills have been repeatedly introduced in accordance with such recommendations. Whenever any considerable modifications of the patent laws shall take place, this will be very sure to be among them; and such modifications can hardly be postponed beyond the present session of Congress.

A reciprocal feeling has from time to time been manifested among our Canadian neighbors, which has thus far, been equally fruitless. Recently a new and more systematic effort has been made. A commission has been appointed to prepare a complete code on this subject, to be presented to Parliament at its session in February. This step is in the right direction and evinces an earnestness which is an augury of success. This relic of a more barbarous age, when hostile legislation was deemed a test of patriotism, will not long resist this assault upon both sides at once, aided by the general intelligence of the age, which has enabled us to understand that justice and generosity to our neighbors are in a thousand ways reflected back in blessings on ourselves. We congratulate the inventive genius of the world upon this auspicious change, and hope the Congress of the United States will vie with the Canadian Parliament in acting more efficiently and speedily to remove disabilities and discouragements from that class which is still continuing to confer the greatest blessing on our common humanity.

We have received a copy of the bill which has been prepared as above stated, and find in it much to approve and little to which we can object. It is drawn upon the general basis of our own patent law, and embodies nearly all of its most valuable provisions. But it copies some of its defects; and with a view, not to officiously interfere in the affairs of our neighbors, but in a spirit of friendli-

ness, and to give them some of the results of our experience, we shall briefly review some of the provisions of that bill.

It establishes a Patent Bureau with a Commissioner at its head, and provides for a Patent Board to be composed of the President of the Council, the Commissioner of Patents, and the Attorneys-general and Solicitors-general of Upper and Lower Canada—six members in all. This board is to grant all patents, and is to exercise an appellate jurisdiction over all the decisions of the Commissioner.

We think this Patent Board will be found cumbersome and inconvenient. We have once had a similar system, which proved unsatisfactory. By the law of 1836, the Secretary of State, the Attorney-general and the Commissioner of Patents constituted a board for certain purposes, but the arrangement has long since proved unsatisfactory. A single executive or administrative officer is preferable to a board, and the business of an office will be more promptly and satisfactorily performed when its incumbent is confined strictly and solely to the duties of that particular office.

A "Register of Patents" and a "Register of Proprietors" are provided for, which are but different names for corresponding features in our system. Certified copies from either of these registers are to be receivable as *prima facie* evidence of the patent or of the license or assignment. So far as it respects the "Register of Proprietors" (or as we term it, the record of assignments), the rule is different with us. The record of an assignment proves nothing, by our law, but the mere fact that there is such a record. It is not even *prima facie* evidence of the genuineness of the assignment. Unless such assignments are required to be acknowledged before some public officer, it may be doubtful whether it will be safe to make such a copy proof of the validity of a transfer. It is true that penalties are provided against false entries and forgeries, but this is rather a slow and uncertain remedy for such evils.

Patents are granted to any person irrespective of his condition or country, and without any discrimination as to the amount of the fee required. This is a great advance over the illiberality and want of wisdom of our own law, and one which, for the credit of our country, we hope the Canadians will not be beforehand with us in making.

The only distinction made between natives and foreigners is that aliens and non-residents are required to commence the manufacture of the thing patented within one year after the date of the patent, and to supply the patented article in sufficient quantities to meet the demand therefor; whereas, the resident citizen has five years within which to do the same. A failure, in either case, to comply with this requirement renders the patent invalid.

We have always been opposed to any such distinction in our own law, but shall not attempt to dictate to our Canadian friends. We should have been better pleased with the law if this feature were omitted; but even while this remains, it will be so much less objectionable than the present law of either that country or of this, that we cannot find it in our hearts to complain. We will, however, suggest that such a regulation will prevent the taking out of many patents in Canada which would otherwise be patented there. A very large proportion of those who make inventions have not the means of manufacturing what they have invented, and the law would thus, to some extent, tend to discourage the very class it is designed to protect.

The proposed law enables parties in patent cases to obtain the testimony of witnesses in the same way as in ordinary civil suits, thus supplying a defect in our own law which is wholly inexcusable.

It provides for a provisional protection of six months, which is better than our caveat system, and intended for a like purpose. It also allows of a temporary protection of three years, at a reduced patent fee, thus enabling the patentee to fully test the value of his patent before incurring the expense of a full patent. This is also a good regulation, and will prevent the accumulation of a vast number of useless patents, which with us serve no purpose but to stand in the way of some subsequent invention.

In relation to re-issues, additional improvements, disclaimers, and assignments, the bill is substantially the same as our law.

The date of the patent is to be stamped or engraved on each patented article vended or offered for sale, under a pretty severe penalty. This is like our law but needs some modification, as sometimes the patented article is so small as not to admit of being so marked.

Provision is made for repealing patents when fraudulently or surreptitiously obtained, or when issued improvidently. This is a very important regulation, not found in our law.

The 53d section contains some provisions which might be advantageously modified. A patent is rendered invalid if the subject-matter is found described in any printed publication prior to its discovery by the patentee. This is our law, but it is too broadly expressed, both here and there. It has sometimes happened that a valuable patent to a *bona fide* inventor has been rendered invalid in consequence of finding a description thereof in some obscure and forgotten work published a quarter of a century previous. In such cases the new inventor has conferred the same benefit upon the world as though he were the *first* inventor of that which, but for him, would have been still unknown to the world. It is like the restoration of a lost art, except that, in this case, the real utility of the invention was perhaps never before known.

Again, the public use of the invention prior to the application for a patent renders such patent invalid. This was our former law, but we now allow it to be used for a term of time not exceeding two years, without prejudice to the inventor. This was a salutary change.

Finally, it is made a misdemeanor, punishable by fine and imprisonment, if it be proved, on the trial, that the patentee was not the original discoverer, but that the invention had been previously in use. Comment is unnecessary to show the undue severity of such a regulation which has doubtless found its way into the bill through inadvertence.

Provision is made in the bill for the registration of designs, the general nature of which is greatly superior to our law, and will supply a want which has long been felt in this country.

The bill is very copious, containing one hundred sections. Our space only permits us to glance at it now. We feel highly gratified to witness its appearance; and with some changes which a more careful consideration will doubtless suggest, it may be rendered a model law, worthy of the imitation of every nation in Christendom.

FIRE-BRICKS.

The bricks which are employed to line the interior of stoves, the sides of furnaces and steam boilers, are made from a peculiar earthy substance known as fire-clay. It is found in deposits in various parts of the world, and very often in the coal regions where it appears in regular beds. The name is derived from its refractory character, as it withstands a very high degree of heat with impunity. Its constituents are silica, 70.6; alumina, 25.9; oxyd of iron, 2; carbonate of lime, 1.5. Sometimes there are also traces of magnesia in it, and the proportions of the foregoing are also modified according to locality. In some deposits there is a little more silica and a little less alumina than in others, but these two substances are the leading ones of this clay, and silica the principal one.

In making fire-bricks, the clay, after being dug out, is exposed to the atmosphere for some days, and sometimes weeks, before it is removed to the mill, where it is ground into a coarse powder with a mixture of about one-sixth of old burnt clay. The common mill used for grinding it is simply two large stones or cast iron wheels set on an edge and revolved by a shaft in suitable bearings in a trough into which the clay is fed. This is the old Chilian mill which has not yet found a superior for some purposes. The trough or bed plate in which the clay is ground is of cast iron, and as the clay is reduced to a proper fineness it falls into a receptacle, from which it is carried away by a conveyor similar to that in a grist mill, and is then deposited in a common pug mill where it is mixed with water and thoroughly kneaded into a proper condition to render it fit for molding. These bricks are molded like building bricks, and are afterwards exposed to heat in a warm apartment, where they are thoroughly dried preparatory to being burned. For this purpose they are placed in kilns similar in form and construction to those employed for baking pottery-ware. Here they are subjected to a very high heat, and it generally takes constant firing for five days before 15,000

bricks can be burned in a kiln 14 feet in diameter and 10 feet high. The firing of such bricks must be conducted with great care. They are so laid on their edges, one above another and in rows, that spaces of about half an inch are left between the lines. These spaces answer the purpose of minute flues; the flame and hot gases from the fire pass through them up to the chimney which is situated at the back end of the kiln. The firing is commenced slowly, and the temperature gradually increased towards the end of the operation.

It is the infusible character of fire-clay which renders it so valuable and serviceable to the arts. Without it, we could not carry on our iron manufactures, as no other substance is equal to it in every respect for lining the walls of the smelting furnaces, and without iron a thousand useful arts could not be practiced. Iron, lime and magnesia—in short any metallic alkaline substance in fire-clay, is an impurity and injures its refractory character. For many years all the fire-bricks used in America were imported from England, and many still come from that country, but in Baltimore, Md., the manufacture of them is now conducted on a very extensive scale from clay found in the vicinity of that city.

WELDING AT A SINGLE BLOW.

In our notice of Wendt & Seymour's scissors, on page 290, Vol. I. (new series), of the SCIENTIFIC AMERICAN, we mentioned the fact that they were welded by a drop which completed the operation at a single blow. From the London *Engineer*, of Dec. 30, 1859, we learn that at one large establishment in England, railroad wheels are welded by a similar process. The several parts of the wheel, having been previously forged, are placed in a mold, in proper position, and heated to a welding heat. They are then placed under a powerful steam hammer, furnished with dies for giving the requisite form to the wheel, when one crushing blow not only welds the several parts together, but almost finishes the wheel. The *Engineer* says that the economy is enormous.

Is not this one of the most important improvements which have been made for a long time in the working of iron? Why cannot knives, chisels, and nearly all articles of cutlery be welded and "finished" (in the technical sense) by this wonderfully short process? As the article does not have time to cool, when thus welded, could it not be plunged at the proper temperature into the cold bath, and thus the hardening, as well as the welding and finishing, be done at one heat?

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

FIRE-ARMS.

This invention consists in the construction of a fire-arm with several chambers arranged in a circle concentric to a common barrel with whose bore they are severally connected by means of converging passages, or by being themselves made to converge towards it. It further consists in the employment, in combination with the said chambers, of a plate containing holes whose arrangement corresponds with that of the said chambers, for the purpose of withdrawing the empty cases of metallic cartridges from the said chambers after their discharge. W. H. Morris and C. L. Brown, of this city, are the inventors.

VALVE GEAR OF STEAM ENGINES.

This invention consists principally in the combination with two movable toes on the valve rockshaft of a steam engine, of two eccentrics arranged at right angles to each other, or thereabouts, on the crankshaft or other rotating shaft of the engine, and connected by a movable yoke with the rockshaft, for the purpose of enabling the steam to be cut off from the cylinder by the main valves at any point of the stroke that may be at any time desirable. The inventor of this improvement is Julius King, of Hoboken, N. J.

AUTOMATIC LAMP-LIGHTING DEVICE.

This invention consists in applying to a lamp a match-holder and friction-plate, the latter having a spring connected to it, and so arranged that, when liberated and actuated by the spring, the friction plate will ignite the match, and thereby cause the lamp to be lighted. The invention is more especially designed to be applied to alarm clocks to be operated by the same simultaneously