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Contents:

(Illustrations are indicated by an Asterisk.)

THE INDIA-RUBBER EXTENSION CASE.

On page 152, present volume of the SCIENTIFIC AMERICAN, we alluded to the fact that an application was now pending before Congress for the extension of the Goodyear india-rubber patents. We stated also that we intended to oppose the extension. To those of our readers who are familiar with the position taken by the SCIENTIFIC AMERICAN in the famous extension case of the Woodworth planing machine patent, it is scarcely necessary for us to explain the reasons why we are opposed to such special legislation on the part of Congress in regard to patents; but for the information of those who are not so familiar with our views on this subject, we will briefly explain the theory upon which we ground our opposition.

It is generally admitted that the United States patent system is well modeled to afford all just and reasonable protection to inventors. Under the amended law of 1836 a patent was allowed for a term of fourteen years, with the privilege of renewal for another term of seven years, making in all twenty-one years. To those who look at the matter in respect to the interests of the inventor and the public—always recognizing that the two interests are interwoven and cannot be separated—it is believed that the general law provides adequate protection for both; and after enjoying the rights guaranteed to the patentee by law, it is no more than just and reasonable that the public should then be permitted to avail itself freely of the use of the invention.

We contend that Congress, having in its wisdom devised a most excellent code of laws for the protection of the rights of inventors, ought not, by special legislation, to over-ride those laws by the bestowment of special rights, unless in case of extreme hardship, which cannot possibly apply to the Goodyear extension case. If one patentee is to hold on to his rights in perpetuity, to the exclusion of all others who may wish to make additional improvements, then the door is effectually closed against all progress. There must necessarily be a limit to the term of all patents, else the field of invention is completely hedged about. In respect to the patents o Goodyear, now pending before Congress for extension, the facts are somewhat peculiar; and if there ever were any cases which deserved to be "turned out of doors," this is one of them. It has less merit, if possible, than the famous Woodworth planing machine.

We freely and fully accord to Mr. Charles Goodyear the originality of his inventions. The public has generally acquiesced in this opinion, and we do not propose to dispute this point; it is not at all necessary for our present purpose. The Goodyear patents—one being for an improvement in processes for the manufacture of india-rubber, and the other being for an improvement in felting india-rubber with cotton—were originally granted on June 15th, 1844; re-issued on Dec. 25th, 1849; extended for a term of seven years from and after June 15th, 1858; subsequently re-issued Nov. 20th, 1860; and will expire on June 15th, 1865. Then, unless Congress can be coaxed and cajoled to favor a further extension, the invention will belong to the public on and forever after the last-named date. Like all other valuable patents, they have been made the subject of extended litigation; indeed, no other patents ever granted in this country have so often appeared in our Federal courts. Daniel Webster and nearly all the great legal "lights of the day" have had a strong "pull" at the india-rubber patents; and, if we mistake not, the present able Chairman of the House Committee on Patents—Hon. Thomas A. Jenckes—has employed a large amount of forensic power in defence of Day and others who have been caught in this legal elastic web, as infringers of the rights of Goodyear. At the time the application was made for the first extension of the patent, a powerful opposition was brought against it; and a dray-load of testimony—*pro* and *con*—was brought before Commissioner Holt, who decided, after a patient examination of the case, to allow the extension. His opinion was strictly a judicial act; parties opposed were patiently heard, and there was no reasonable ground of complaint. We then thought, and still think, that the Commissioner did right in allowing the extension, and if any of our readers have a curiosity to read the Commissioner's opinion, they will find it on page 350, Vol. XIII. (old series) of the SCIENTIFIC AMERICAN.

The question now presents itself—what possible interest has the public in opposing the further extension of these patents? We answer, most decidedly, that not only the Government, but also the great public generally, have a very large pecuniary interest to prevent the consummation of this extension scheme. A few facts will clearly demonstrate the soundness of our position. The business of manufacturing india-rubber goods is now immense. Under the protection afforded by the Goodyear patents, the business is divided and sub-divided into various branches, all of which are under contribution to the owners of the patents. In addition to the royalty paid to these owners, the public are compelled to pay a large manufacturer's profit, amounting in the aggregate to millions of dollars annually. Now if these patents are extended beyond the year 1865, millions more will be drawn out of the pockets of the people to support these gigantic monopolists, not one dollar of which can possibly benefit Charles Goodyear, the original inventor and patentee. Goodyear is dead; and the benefit of the extended term of the patent, though ostensibly for his heirs, will result in enriching, at the public's expense, those immense manufacturing concerns, not one of which had anything to do with originating the invention. Whenever the patent ceases to protect them in the *exclusive* manufacture of india-rubber goods, they will still be able, in a great degree, to control the business. Their large and well-ordered establishments—with the market under their control—can successfully contend against opposition *at fair remunerative profits*, beyond which they could not presume, without danger of bringing competitors into the field.

That the people may more clearly see the magnitude of the case as applied to their interests, we enumerate some of the many articles which are now controlled by the Goodyear patents, namely—boots, shoes, leggins, buttons, combs, pencils, knife and razor handles, watch-chains, all kinds of jewelry in imitation of jet, canes, balls, dolls, cups, straps for bills, washing-machine rollers, horse and carriage covers, car springs, hose, steam engine and other packings, belting, all kinds of clothing, &c. Now here is a chance for the people to save themselves from at least one form of taxation. Let all feel it to be their interest to oppose this patent extension. Write protests to your Representatives and Senators—circulate petitions—get local newspapers to write against it; and then, in the face of a strong public opinion, Congress will assuredly reject the claims.

AIR-PUMPS AND CONDENSERS.

The greatest confusion of ideas concerning the functions of air-pumps and condensers exists in the minds of machinists and engineers unfamiliar with the construction of low-pressure engines. Very many individuals of this trade have worked all their lives in places remote from seaports, or large manufacturing establishments, and have never seen a condensing engine, or even so much as an engraving of one. To such persons the following details may be of some value.

The business of the air-pump is first to remove the air from the condenser so that the injection water for condensing steam can enter, and ultimately remove the water of condensation from the condenser, also vapor and air which leak through the joints, or enter with the injection water. Between the air-pump and the condenser there is a channel-way or passage in the bed-plate on which the machinery sets, and in this channel-way there is a valve opening toward the air-pump. This is called the "foot" valve, presumably because it lies at the foot of everything, there is no other propriety in the name. At one time this valve was made of brass, it is now, in nearly every case, supplanted by square sheets of india-rubber about an inch and one-fourth thick, resting on perforated brass seats; these valves work without noise and are much better otherwise. For marine use the air-pump is cast-iron lined with brass, but when fresh water is employed for condensation, the brass lining is generally omitted. Condensers are of two kinds; the jet and the surface; the jet condenser is most usually employed, and is merely a cast-iron vessel of any desired shape, being made to conform to circumstances, sometimes forming a portion of the engine frame; at others entirely independent of the engine and placed on one side. For beam engines it is round, and of the same diameter as the cylinder which sets on top of it and a little larger in capacity than the air-pump; near the top of the jet condenser there is a large thin plate full of holes about half an inch in diameter, this plate has a rose-headed pipe running up through the center like a piston-rod; it is bent to an elbow about two or three feet below the plate and then runs through the condenser to the outside where there is a valve to regulate the admission of water to the condenser; this valve is called the injection valve, and is controlled by a wheel in the engine room. This is the simplest form of condenser and the one most used, although the surface condenser is gradually coming into favor. The surface condenser consists in exposing a large amount of cooling surface in the shape of tubes, to the action of the injection water. The water does not come directly in contact with the steam to be condensed, but the latter exhausts into the tubes and is condensed by water circulating through the condenser outside of the tubes. In this manner the boilers are always supplied, or supposed to be, with fresh water, for as the steam is condensed to a liquid form again, it is fed back to the boiler and thus used over and over again; in this way salt water raised into steam and then condensed becomes fit for drinking purposes after filtering.

These details and principles are well-known to marine engineers, but to others at a distance from seaports the information will no doubt be acceptable.

A MOST NOBLE PROJECT.

Everything relating to the improvement of mechanics, both socially and intellectually, is of the greatest interest and importance. The welfare of the whole community is most sensibly affected by the degree of cultivation the working classes possess. During the recent disturbance among the machinists' trade in this city, the proprietors of the principal works of this kind came together for mutual protection, feeling that the course adopted by the workmen to secure an advanced rate of pay was not the proper one. This convocation was styled the "Mechanics' Association," and the liberal sum of $100 was charged each member as an initiation fee. So soon as the men returned to work, these employers set about raising the wages of the deserving men; showing by this course that their action towards them was not dictated by parsimony, but wholly from principle. This is not all that was done. Mr. J. S. Underhill and Mr. George W. Quintard, both

proprietors of large machine-works in this city, conceived the idea of founding a "Mechanics' Library"—one that should be such in reality—a place where all the best works relating to the advancement of the trade could be studied by workingmen, free of charge, or at least at a merely nominal fee, for membership. It is not intended to stock this library and reading-room with modern novels, but with the foreign and domestic scientific journals and books relating to art and the practice of it. Should the scheme be carried out, as we trust it may, it will be of incalculable advantage to the mechanical interests, and a credit to the energetic and benevolent originators of the idea. The sum of $8,000 has been subscribed already; the principal engineering firms are directly interested in the enterprise, for they will reap substantial benefits in the future from the generations of educated men which are sure to arise from such an advantage as this institution will afford.

BREECH-LOADING RIFLES FOR THE ARMY.

We have long been of opinion that one regiment of soldiers armed with good breech-loading rifles would be more efficient than three regiments, perhaps superior to ten regiments, armed with muzzle-loaders. With a breech-loader the soldier consumes but one or two seconds of time in the labor of loading, and he can pour an almost constant stream of balls into the ranks of the enemy. It has been objected that when a soldier could load with so much facility, he would throw away his ammunition in careless firing; but we have never doubted that this difficulty might be overcome by a proper drill. In the case where the soldier can load so quickly, he may be taught to make all of his movements slowly and to take a much cooler and better aim than he will when he hurries through the operation of loading.

Our attention has been called to this subject anew by the reception of a pamphlet written by W. C. Dodge, Esq., Acting Examiner, United States Patent Office, in which the advantages of the breech-loading rifle for army use are very ably set forth. Mr. Dodge cites more than forty officers in our army, including Major-generals McClellan, Hooker, Fremont, Rosecrans, Burnside and Sigel, who approve of the introduction of this class of arms. He also gives the following letter from Col. Wilder, who has tried the guns in actual warfare:—

DEAR SIR:—Your letter of Dec. 25, 1863, is just at hand. In reply, I am ready to urge the expediency of arming all the mounted troops of this army with the "Spencer Repeating Rifle." It is a most perfect weapon, when used by cool men, and I have no hesitancy in saying (after commanding a brigade armed with them for nearly a year) that men so armed can always defeat at least double their number, and my command have repeatedly driven three times their number of rebels. Since using this arm my command has never failed to break any column of troops they have attacked, and have never been driven by any force, no matter how heavily they were massed against them.

At Farmington, Tennessee, in the late raid of the rebel General Wheeler within our lines, four of my regiments broke through and scattered two entire divisions of mounted rebel infantry; fighting on foot and formed in three lines, my men captured their battery and dispersed their entire force. I would respectfully refer you to Brigadier General Crook, commanding the second division of cavalry in this army, who witnessed this fight, and can vouch for its correctness.

At Chickamauga on the 20th of September my brigade of five regiments drove back the rebel column that had driven the 20th army corps, and, alone and unsupported, held the entire left of the rebel army for four hours, and were withdrawn without being pursued.

I could enumerate at least thirty fights in which the "Spencer Rifle" has triumphed over other arms in such apparently overwhelming numbers as to almost appear incredible. They should be made with a ring in the side of the breech-piece, so as to be carried as a carbine. The ammunition being water-proof, is not worn out or destroyed like other kinds.

I believe that if the Government would arm ten thousand mounted infantry with these guns, and put them under a good enterprising officer, they could destroy all the principal railroad lines in the South, and do more damage to the rebellion in three months than fifty thousand ordinarily armed infantry could in a year.

I wish I could see those having authority in this matter, that I might impress upon them the great importance of using these arms.

I am, sir, very respectfully, your obedient servant,

J. T. WILDER.

Nashville, Tenn., Jan. 7, 1864.

A PLAN is being rapidly matured for the establishment of a woolen factory in Milwaukee, on a scale heretofore unknown in the North-west. Such a manufactory, besides being a profitable investment for the manufacturers, will greatly aid in the development of agricultural resources by furnishing farmers with a better market.

HOW THE STERNS OF SCREW SHIPS ARE BORED.

Many mechanics are aware that the hole in the stern of a screw ship is bored out after the ship is planked, caulked, and nearly ready to launch, so that no disturbance of the proper direction of the hole or bore may occur from the fastening of or strain caused by the completion of the rest of the vessel. The operation of boring is thus accomplished: The hole is first roughly cut out by the carpenter through the "dead" (or solid) wood of the stern. The length of this dead wood varies according to the dimensions of the ship. In this rough hole a long iron boring bar is placed, supported by bearings at either end; the bar has an ordinary boring head upon it, which is a circular cast-iron wheel, driven from end to end of the hole by a screw; the cutters are fixed in this head and the bar is driven by a spur-wheel and pinion; sometimes a small engine furnishes the power, at other times "muscle" does it.

The time required to bore out the stern varies with the nature of the job. Sometimes the copper and iron through-fastenings of the timbers run into the hole and cause a great deal of trouble. In the *Dunderberg*, the huge iron-clad now building by Mr. Webb, the length of the dead wood is 24 feet, 7 inches, and the diameter of the hole when finished is 25 inches. This length is run in two hours, cutting one inch on a side at the ends; inside the cut has to be lessened as the bar springs too much to carry it. This is remarkably fast work—about 2½ inches, lineal speed, per minute for the cutter. After the hole is bored, the shaft pipe, made of brass, is inserted; on the inboard end of this pipe there is a stuffing box and gland, and out-board the pipe has a lining of liginum vitæ inside of it, constituting a bearing on which the main shaft works; the shaft is also fitted with a brass sleeve, shrunk on where it passes through the pipe so that it may not be corroded by the action of salt water leaking through. In iron ships, of course, the construction is different and no hole has to be bored; these details relate only to wooden vessels.

REVIVAL OF THE COTTON MANUFACTURE.

In the debate which followed the presentation of the Queen's address, on the opening of the British Parliament, on the 4th of February, Lord Derby endeavored to show that the distress in the manufacturing districts had not been relieved to the extent asserted in the address. But in the course of his remarks he made the following admission:—

"I venture to entertain a hope that the worst and heaviest of the pressure is at an end, and that in the course of a few months we may date a considerable increase in the industry of the manufacturing districts. [Hear, hear.] I may be permitted to say that the anticipations which were formed last year of the expected supply of cotton have been realized to the letter, and therefore we may look with greater confidence at the anticipations put forth by those who say that, towards the beginning of April or May, we may calculate upon a supply of cotton which will be sufficient to maintain the mills in working order for five days in the week throughout the manufacturing districts. . . . . I may venture to say this is a proof of the hopeful spirit which animates the people in these districts, that there are no less than one hundred new mills in the course of erection and being prepared for a start on the revival of the cotton trade, and one of these mills will have no less than 5,000 looms in it."

The same revival is taking place in this country. The Woonsocket *Patriot*, which is published in the heart of the manufacturing district of New England, remarks that there is great scarcity of labor to supply the mills which are resuming operations.

It seems that the high prices of cotton, caused by the war in this country, have so stimulated the cultivation in other places that, in the course of only three years, the product is sufficient to supply five-sixths of the machinery of the world.

In this country, as well as in England, the opportunity of the suspension of manufactures has been employed by mill-owners in the repair and extension of their works, and in the construction of new mills and machinery. The cotton manufacture will soon be in full activity, and on a larger scale than ever before.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Foot Shield for Skates.—Straps are considered by experienced skaters to be the most efficient means for securing skates to the feet, as they insure a firm connection between the foot, boot and skate. There is one disadvantage, however, attending their use, which consists in the pressure of the straps upon the foot, preventing the free circulation of blood, and thereby causing cold feet—a great inconvenience; and in case the wearer has corns, causing a great deal of pain. This invention is designed to obviate this difficulty, and it consists in the employment of a shield constructed of metal or other suitable material, and of such a curved form that it will encompass the foot like an arch, while its ends will rest upon the edges of the sole of the boot or shoe, and the strap or straps pass over the shield and press thereon when the skate is secured to the foot, thereby relieving the same of all pressure of the strap or straps. De Witt C. Winans, of New York city, is the inventor of this improvement.

Machine for cutting Tobacco.—The object of this invention is to produce a simple, compact and cheap machine for cutting tobacco or other material of any desired fineness, so that every small manufacturer is enabled to cut up his own tobacco to suit himself and his customers. The invention consists in the application of one or more oscillating adjustable levers acted upon by eccentrics or cams, and acting on rising tappets in combination with the cutter wheel and with a lever spring catch which acts on the teeth of a ratchet wheel secured to the end of a screw spindle which imparts motion to the follower moving in a suitable box, and through it to the tobacco or other material to be cut, in such a manner that, by the combined action of the adjustable lever, tappets, ratchet wheel, screw spindle and follower, an intermittent feed motion is imparted to the tobacco or other material in the box, and said material is cut up to such a fineness as may be determined by the position of the oscillating levers. The invention consists, also, in the employment of a laterally-sliding nut in combination with the screw spindle, follower and box, in such a manner that by imparting to said nut a lateral motion, the end of the box is thrown open for the purpose of removing the follower and introducing a fresh charge of tobacco or other material to be cut. E. W. Ritterhoff and C. A. Colquitt, of New York city, are the inventors of this improvement.

Machine for stamping Carpenters' Squares.—This invention consists in the employment of one or more rollers, each provided with a series of dies representing the figures and the graduation of the squares or other articles to be stamped, in combination with a smooth reciprocating bed, in such a manner that by the action of the dies the article to be stamped is pressed down flat upon the bed and prevented from springing or bending. The invention consists, further, in the arrangement of a bed resting in a semi-circular cavity or otherwise supported in such a manner that said bed is rendered self-adjusting in a transverse direction, and the inequalities in the thickness of the article to be stamped are compensated. The invention consists, finally, in the employment of an eccentric cam acted upon by an adjustable weight or spring, in combination with the reciprocating bed and stamping rollers, in such a manner that the article to be stamped is pressed up against the rollers with a uniform yielding pressure, which can be regulated according to the nature of the work to be accomplished. H. K. Jones, of Kensington, Conn., is the inventor of this improvement.

Plates for Bank-note and other Engraving and Printing.—Much of the engraving on bank-note plates is produced by what is called transferring impressions from the surfaces of hardened steel rollers, the face of the plate being passed under the roller or the roller passed over the face of the plate several times back-and-forth, while applying a heavy pressure. To enable this to be done successfully it is desirable that the face of the plate have a mellow softness and yet the plate be hard and strong enough to resist the heavy pressure. The plates made of fine iron sometimes used are frequently so stretched in the roll-