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**Contents:**

(Illustrations are indicated by an asterisk.)



## 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 1851 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—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

For full particulars concerning extension, address

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## THE "SCIENTIFIC AMERICAN" FOR THE ENSUING YEAR.

On the first day of January next we shall commence Vol. 12 of the New Series of the SCIENTIFIC AMERICAN, and we scarcely need to remind our readers that in the present state of Journalism in this country, things are so much changed by the exigencies of the war, that publishers are compelled to carry burdens almost too heavy for them. These are not imposed by the arbitrary power of Government, but are the general result of circumstances which the wisdom and foresight of our rulers could not control. A free press we have, and must have; but cheapness is a condition absolutely necessary to its growth and development. Nothing short of these two elements can meet the wants and interests of the American mind. That the latter, however, cannot well be expected at the present time, may be seen from a reference to the high prices which obtain for every thing used in a publishing office. Paper that once cost 9½ and 10 cents per lb., is now hard to be obtained at 30 cents per lb. A like advance has been made in all other articles. Many feeble papers have already expired, and many more must experience a like fate, unless by some sudden turn of fortune's wheel they shall be relieved of present pressure.

In spite, however, of these burdens, which we confess to have felt to some extent by a decreased profit for our labor, we have maintained the standard of the SCIENTIFIC AMERICAN equal to that of any previous year. The paper we believe has lost none of its old renown; indeed, if we may trust to the judgment of many of our oldest readers, we may well cherish the conviction that it was never before so well edited. We are conscious, at least, that our labors in this particular have never been more earnestly directed to gratify our readers. The valuable information published in the SCIENTIFIC AMERICAN can not be obtained from any other journal. In the volume now closing the mechanic will find that special attention has been paid to his interests; the manufacturer will observe many hints on workshop economy, new fabrics, systems and schemes, the inventor and patentee will find the fullest and earliest intelligence on all that belongs to his peculiar calling; and the general reader will observe that all the great industrial enterprises, all the newest and best plans for ordnance, torpedoes, small arms, steam engines and telegraphing are noticed and discussed. Articles on the large manufactories have been illustrated also, and described at length.

The SCIENTIFIC AMERICAN has had early intelligence of every rebel iron-clad of note, and also descriptions of our own monitors, and illustrations of the Government ordnance, and experiments on iron-clad targets. The great question of the expansion of steam has again arisen, and is still being tested. The Hecker and Waterman experiments, as well as those of Government, are yet under way; and the partial results of the former have already been published. Illustrated articles on machinists' tools, as well as practical rules and hints, will be found in the approaching volumes. The first volume will open with an article on "Lathe Tools," in which all the newest and most approved forms, as well as the work to which they are adapted, will be lavishly illustrated. The attractions, past and forthcoming, of the SCIENTIFIC AMERICAN, render it indispensable to every workshop, and we intend that it shall be welcome at the fireside.

## AMERICAN MACHINE TOOLS.

Not many years ago, when a machinist drilled a hole in fine work for a five-eighth bolt, he made it a sixteeenth larger than the bolt, for good measure. When he wanted the bolt itself, he got out the stocks and dies if they were not lost, and twisted away until it was made. If he required a hole particularly smooth and true, he took a piece of steel to the tool-dresser and had it forged half round, after which he turned it in the lathe a little tapering, so that it would enter, and so that he would have to turn his work over ten or eleven times, and mark it all up in the vise before he could safely say he had made a good job! When these miraculous holes were finished everybody would put their fingers in "to see how smooth they were."

Not many years ago drills cut three-sided holes, and the drill that worked round without twisting off, was put carefully on one side. Lathes that bored tapering holes, largest on the back or front, as the case might be, were regarded as in chronic difficulties; and the metal that could not be bored out by humoring the tool was afterwards taken off with a half-round file.

How far removed the machinist of the present day is from these rude processes let the tools in use answer. The half-round rimmers that looked like clothes pins, are handed over to boiler makers, to whose work they properly belong. The bolts are cut in engine lathes, and the threads, instead of being half stripped and thrust forth naked to the world, are clear, clean, sharp and well defined. The stock and its dies, except for occasional use, are supplanted by "sizers," or else deposed altogether. Experienced mechanics know well enough how to correct faulty drills; and as for the lathes that bore holes not parallel, they must be some of the old-fashioned ones, for those built lately are given to no such defect.

The lathes built at Moodna, Orange county, N. Y., are most excellent ones. They are convenient of access in all parts, made of superior materials, and in the best manner. They are geared for screw cutting, and the driving pinions on the spindle, as well as those for feeding, are of wrought iron. The nuts of one size all fit one wrench, which is sent with the machine, so that in changing gears for cutting threads no screw wrench need be used. The tool post slides in slots in a raised bed, so that it can be moved sideways, and the bed or ways has no V-shaped slides to get bruised or jammed by laying tools down upon them. There are other good features in these lathes which we need not here enumerate. The experience of all mechanics who have used them verifies our statements. We have, at random, selected them from many others as an example of what first class engine lathes for general use should be.

The shapers or universal planing machines, at one time made by the Lowell Machine Shop, are also excellent tools of their class; and in this city Mr. A. M. Freeland makes lathes and planers of superior finish and durability. In fact, the general character of American machine tools has of late years been vastly improved. Manufacturers have learned that the best work gives the best satisfaction, and that a reputation once gained for good tools is an investment that pays. Messrs. William Sellers & Co., of Philadelphia, build tools which are fine examples of modern machine work. Messrs. Bement & Dougherty, of the same city, have of late years built and introduced a machine for cutting key ways for gibs and keys in connecting rods, which is a most useful one, effecting a vast saving of labor and time. Messrs. Sharp & Browne, of Providence, R. I., are noted for the superior workmanship bestowed upon their milling machines; and the Putnam Machine Co., of Fitchburg, Mass., build most excellent machine tools of all descriptions. We cannot, however, enlarge further upon individual firms, for our columns are not extensive enough to make mention of all deserving public notice. Any who are omitted will feel that their claims are reserved for another day,

Where once we drilled a single hole at a time, we now have gang drills which make two, three or four holes at once, either of the same or different sizes, and the saving in time is very great. Where formerly we chipped the nozzles of heavy cylinders and similar parts on surface condensers, we now employ portable planing machines. Five-eighth and a sixteenth holes for five-eighth bolts are heard of no more. Men have learned that it is better to put the work in its proper place, drill the holes in their places, and fit the bolts to them than to pierce the job with holes too big, put in rough bolts, shift the work to the final position, and insert steady pins to keep it fast. The bodies of the bolts are the steady pins, and nuts screwed up almost with the fingers, will hold more than a screw wrench could make them when the bolts were pitched into the holes.

These are not trivial things, but are of vital importance to the endurance of machines, whether tools or engines, and it is gratifying to know that intelligent mechanics recognize the principles here laid down. Let us continue to improve, to make American tools the best in the world, and they will soon be in general demand.

## POTATOES IN FAT.

There is a common notion among cooks, that when tallow has been burned, it can be cleaned and made white by dropping into it a few slices of raw potato. If this be true we can form no idea of the process by which the cleaning is effected, and we strongly suspect that the opinion results from one of those errors of observation which are so very common. But that potatoes will prevent fat from being blackened by heat, in some cases, cannot be doubted.

If tallow be heated to a temperature of about 600 degrees, the oxygen and hydrogen will be driven off, and the carbon remain as a black powder which will settle

to the bottom of the dish. The fat is not burned, in the ordinary sense of the word. Burning is a rapid combination of the substance with oxygen, but in this case there is no new combination, but a decomposition. The fat undergoes destructive distillation.

Now, raw potato contains a large proportion of water; if this water is heated to a temperature of 212°, it is evaporated, and as long as the evaporation is going on, all heat which enters the mass is absorbed and rendered latent in the process of converting the liquid into vapor. Consequently the fat is prevented from reaching the temperature of 600°, at which its destructive distillation takes place.

But after it has been decomposed and the carbon has been precipitated, it is impossible to conceive of any process by which slices of potato would cause the carbon to disappear.

## CLASSICAL VS. SCIENTIFIC EDUCATION.

The report of a Parliamentary commission, charged with the investigation of the condition and management of certain schools and colleges, has attracted much attention in England. Among other inquiries, the commission sought to ascertain the comparative value of the classical and the scientific systems of education. For this purpose, some very noted witnesses upon both sides were summoned. The advocates of the Latin and Greek system thought that none but their own disciples were competent to express an opinion upon either side of the subject. In support of this view, the Rev. Mr. Temple, of the celebrated Rugby school, said:—

"The one, (the classical student), is naturally led to the study of man, and to the study, therefore, of what is good for the discipline of the mind; the other, (the scientific student), has not studied man, but things, and it is not his business to know what is good for the discipline of the mind. The study of the philosophy of the question comes properly within the sphere of one man's science, but not properly within the sphere of the other man's science."

Concerning mathematics, which hold a very important position in every college curriculum, Dr. Carpenter, who ranks among the first scientific men of Great Britain, whose writings frequently adorn the pages of the SCIENTIFIC AMERICAN, testified:—

"Mathematical training exercises the mind most strenuously in a very narrow groove, so to speak. It starts with axioms which have nothing to do with external phenomena, but which the mind finds in itself; and the whole science of mathematics may be evolved out of the original axioms which the mind finds in itself. * * Now it is the essence of scientific training that the mind finds the object of its study in the external world. It appears to me that a training which leaves out of view the relation of man to external nature is a very defective one, and that the faculties which bring his intelligence into relation with the phenomena of the external world are subjects for education and discipline equally important with the faculties by which he exercises his reason purely upon abstractions. * * I may add, that having given considerable attention to the refuted phenomena of mesmerism, electro-biology, etc., I have had occasion to observe that the *want of scientific habits of mind* is the source of a vast amount of prevalent misconception as to what constitutes adequate proof of the marvels reported by witnesses neither untruthful nor unintelligent as to ordinary matters. I could mention striking incidents of misconception in men of **high literary cultivation**, or high mathematical attainments; whilst I have met with no one who had undergone the discipline of an adequate course of scientific study, who has not at once recognized the fallacies in such testimony when they have been pointed out to him."

Sir Charles Lyell said:—

"It is a very remarkable fact, that if a scientific book is published, it depends more for its sale on the middle classes of the manufacturing districts than on the rich country gentlemen and the clergy of the agricultural parts of the country. * * I think the present state of things unhealthy and dangerous, particularly so in reference to the teaching in this country by the clergy, and a vast proportion of the university men are going into the church. In order to bring their knowledge more in unison with that of the artisans, it is particularly desirable that a certain portion of science should be taught. * * I feel that there is a dangerous want of sympathy at present between the better informed working class of the manufacturing districts and the clergy. Besides, the principle of limiting education to the languages and the mathematics is a direct injury to many men. A large portion of those who would have shown a strong taste for the sciences are forced into one line, and after they leave their college they neglect branches they have been taught, and so cultivate neither the one nor the other. I have known men quite late in life, who had forgotten all the Latin and Greek which they spent their early years in acquiring, hit upon geology or some other branch, and all at once their energies have been awakened, and you have been astonished to see how they came out. They would have taken that line long before, and done good work in it, had they been taught the elements of it at school. (Mr. Twistleton.)—So there was a mental waste in their youth? Quite so."

## A HINT FOR THE HOLIDAYS.

The approaching holidays remind us of the beautiful custom, now almost universal, of gift-giving. One is often puzzled to know what to select. Even when the gift must be humble and inexpensive there is ample room for the exercise of discernment. That is the wisest gift which confers the most lasting benefit on your friend; and the result of such benefit will naturally be continuous remembrance of, and esteem for you. Gentle reader, would you like to make such a present to your friend? Send him the SCIENTIFIC AMERICAN for a year, at $3. Its welcome appearance at the close of every week will remind him of your goodness. On every page he will find something of value and interest with which he will insensibly connect your name. Kind parent, would you like to benefit your son, inspire his mind with love for useful things, keep his thoughts from evil, and help him to rise in the world? Give him, for Christmas, the SCIENTIFIC AMERICAN for a year. It may save you hundreds of dollars in money and thousands of heartaches.

## ALUMINUM BRONZE BEARINGS.

Aluminum bronze is a most excellent composition for boxes or bearings that run at a high speed, such as saw mandrels, fan blowers, etc. There is a small mandrel in Carhart & Needham's melodeon factory which runs 7,000 revolutions per minute; it has aluminum bronze boxes, which are perfectly cold to the touch. Mr. Carhart informed us that he had tried everything before this without success.

Aluminum bronze is made from copper, 90 parts, aluminum, 10 parts, and can be obtained in this city. It was recently advertised in back numbers of this journal. Propeller shafts and boxes troubled with chronic heating might be cured by this metal. Boxes for fan blowers particularly, the shafts of which run from 3,500 to 4,500 revolutions per minute, might be easily lined with this metal. It is pronounced by those who have used it to be a superior composition for all journals at great velocities. Persons who are unaware of its merits will be benefited by remembering these facts.

## Machine for Registering Musical Notes.

One Herr Endres, of Mayence, has discovered a machine which will write down music as fast as it is played, thus entirely doing away with the great labor of composing. A German paper thus alludes to it:—

"This machine, the inward organization of which is still a secret, may be adapted, with very little trouble and at small cost, to any new or old keyed instrument, such as the organ, piano, etc., without the slightest injury to the same. Though it is reckoned for any number of octaves, it is also so small in compass that it can be completely concealed under or behind the instrument. Leaving out the question of the mechanism inside, the visible process outside consists in inserting at one end of the machine an endless strip of paper, about two inches broad, which comes out at the other end with red lines ruled on it, and the notes, etc., printed thereon in black. The machine reproduces every note sounded by the keys, be the notes on or between the lines, not only marking their position, as c, d, e, and so on, but their value as conveyed by the usual characters; that is, it prints off the notes as demi-semi-quavers, semi-quavers, crochets, and semi breves; it shows whether they are dotted or not; marks the pauses; the *forte* and the *piano*; points out where the employment of the pedal commences and where it leaves off; and, in a word, reproduces the music so completely that very little is left for the pen to do afterward. Following every wish of the player as willingly as his fingers, the mechanism works in three-four or four-four time (and every other time may be reduced to these), and proceeds quickly or slowly at pleasure. But it does even more: it immediately transposes any piece of music from one key to another. While, however, it enables a composer instantaneously to preserve his musical thoughts and fancies by means of the usual notation, it also gives the power of immediately taking a copy of every piece of music; of writing out from a score the separate parts of instrumental composition; and of exercising a control over learners by showing whether they play correctly, for it marks every fault, and whether they have repeated certain passages so and so many times. Thanks to this invention, a deaf person may see what he has played; the master give his pupil a lesson, without being close to him, and so forth. If this new machine can readily do all, which, to judge by the experiments already made, there is hardly any doubt it can do, it will certainly occasion a revolution in the world of music.

## How to Act when the Clothes take Fire.

Three persons out of four would rush right up to the burning individual, and begin to paw with their hands without any definite aim. It is useless to tell the victim to do this or that, or call for water. In fact, it is generally best to say not a word, but seize a blanket from a bed, or a cloak, or any woolen fabric—if none is at hand, take any woolen material—hold the corners as far apart as you can, stretch them out higher than your head, and, running boldly to the person, make a motion of clasping in the arms, most about the shoulders. This instantly smothers the fire and saves the face. The next instant throw the unfortunate person on the floor. This is an additional safety to the face and breath, and any remnant of flame can be put out more leisurely. The next instant, immerse the burnt part in cold water, and all pain will cease with the rapidity of lightning. Next, get some common flour, remove from the water, and cover the burnt parts with an inch thickness of flour, if possible; put the patient to bed, and do all that is possible to soothe until the physician arrives. Let the flour remain until it falls off itself, when a beautiful new skin will be found. Unless the burns are deep, no other application is needed. The dry flour for burns is the most admirable remedy ever proposed, and the information ought to be imparted to all. The principle of its action is that, like the water, it causes instant and perfect relief from pain, by totally excluding the air from the injured parts. Spanish whiting and cold water, of a mushy consistency, are preferred by some. Dredge on the flour until no more will stick, and cover with cotton batting.

PHOTOGRAPHY.—We have received from John A. Whipple, photographer, No. 96 Washington street, Boston, finely-executed pictures of the brave Lieut. Cushing, who destroyed the rebel ram *Albemarle* in the harbor of Plymouth, N. C. Also of the *Kearsarge*, the war vessel that destroyed the *Alabama* off the harbor of Cherbourg, France. These pictures attest the high skill of Mr. Whipple as one of the best photographic artists in the country.