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SCIENTIFIC AMERICAN SUPPLEMENT

No. 695.

For the Week Ending April 27, 1889.

Price 10 cents. For sale by all newsdealers.

REMOVAL OF AERIAL ELECTRIC WIRES IN NEW YORK.

The work of removing the aerial telegraph, telephone, and electric supply lines in this city, with a view to forcing the electrical supply companies to use the subway system in such streets as contain it, bas been vigorously prosecuted during the past week. An attempt, on the part of the Western Union Telegraph Co., to obtain an injunction in the Federal courts having failed, the city authorities put a large force of men at work to cut and remove the wires and lower the poles. Unfortunately, the work has been marred by casualties, one instant death and several injuries resulting. One lineman, who had climbed a pole, narrowly escaped with his life, as the rotten wood gave way, and the pole, unbraced by the usual telegraph lines, fell. It fortunately struck against a building, so that the operative was afforded a chance of escape, which he was quick to profit by. This accident showed that the poles were a distinct source of danger as they became more and more decayed.

A very impressive feature of the operations is the comparative darkness to which the city in these parts is relegated at night. The gas lamps are quite unable to supply sufficient light for the people, who have now been accustomed to electric illumination. It is to be hoped that the electric light companies will make every effort to start their lamps anew and give the many centennial visitors a good illustration of subway electric supply and illumination.

A NEW SUIT UNDER ELECTRIC DYNAMO CONSTRUCTION PATENTS.

The initial proceedings in a suit brought by the Westinghouse Electric Company, through its lessee, the United States Electric Light Company, against the Manhattan Electric Light Company, were taken on April 18. The suit, presumably the first of an extensive series, is notable from the patents under which it was brought. These are two patents granted within a few days to Edward Weston, the well known inventor, after nearly seven years' delay caused by interference proceedings. If they prove to be valid, they will be among the most valuable patents extant in the class of dynamo-electric machinery. The feature of construction covered by them is the building up of an armature core from iron disks with interposed plates of insulating material. Four carefully worded claims, undoubtedly the broader from the early date of application, when the field was unnarrowed by similar inventions, cover as far as can be seen the whole system of disk-built armatures. As the vast majority of armatures of the well known Siemens type, both for dynamos and motors, are thus constructed, it will be evident that much litigation may be in prospect, and that these two Weston patents may yet figure in the annals of patent law proceedings with the Morse, Goodyear, and Bell patents.

DELAY IN GRANTING APPLICATIONS FOR PATENTS.

On April 16, 1889, two patents were granted to Edward Weston, which bid fair to be basis of many and extensive suits for infringement. They illustrate the evils of the present system of granting patents, as regards the delay in concluding the proceedings. On September 22, 1882, the original application for this invention was filed as for a single structure, and eight weeks later a division was made so as to include the matter in two applications. This was nearly seven years ago. It would be impossible to give any estimate of the thousands of dynamos and motors that have been constructed with the armatures described and claimed in these two patents. Every day sees the factories all over this country turning them out by the wholesale. In the face of this testimony to their merit, it seems that a radical defect must exist in Patent Office proceedings for nearly seven years' delay to have occurred in granting them. Six years have been devoted largely to interference proceedings to settle whether the patent should be awarded to Edison or to Weston. And now, after all that contest, the same battle will have to be fought over again in the Federal courts.

It may well be asked what good is attained by judicial contests before the Commissioner of Patents. The infringement suits brought under a patent that has been contested under interference proceedings in the Patent Office are not accelerated by the contest before the examiners of interference. The Federal courts attach little weight to Patent Office decisions. As the present case stands, the patentee has been barred for over six years from bringing suit under apparently a most meritorious patent. It is true that the triumph has come, but the years that have elapsed have robbed it of much of its value. Many old time users of the invention, who should have been *prima facie* infringers, are out of the field. With present infringers, whose name is legion, if the patents prove valid, a battle of probably greater duration has to be fought.

It would be far simpler for the Patent Office to act in the registering faculty, rather than in the judicial. Abandoning the latter function, it should grant patents to any applicant, and let the battles of priority, like those of infringement, be fought in the Federal courts. This would be a move in the right direction, and in that of simplification. It would tend to make attorneys more careful in drawing up claims, and would multiply immensely the number of examiners, for every inventor personally would be his own examiner, and would search the records in order to waste neither time nor money in procuring a worthless patent, or else he would employ competent attorneys and experts to do the same for him.

POSITION OF THE PLANETS IN MAY.

VENUS

is morning star. She is a charming object in the eastern sky before sunrise, as she oscillates westward from the sun, rising earlier every morning and increasing in brilliancy as a larger portion of her illumined disk is turned toward the earth. Her rapid movement southward may be observed, her declination on the 1st being 19° 7′ north, and on the 31st 11° 33′ north. She rises on the 1st a half hour before the sun, and on the 31st about an hour and three-quarters before the sun. Venus rises on the 1st at 4 h. 28 m. A. M. On the 31st she rises at 2 h. 45 m. A. M. Her diameter on the 1st is 59″.6, and she is in the constellation Aries.

JUPITER

is morning star. There will be a fine opportunity for contrasting the two planets. Venus is the more brilliant, but her luster is dimmed by the radiance of the dawn, while Jupiter seems almost her equal in brightness as he shines with the midnight sky for a background. The regal planet is approaching the earth, and will be superb when, on the last week of the month, he looms above the southeastern horizon about 9 o'clock in the evening, and looks down from the meridian at 1 h. 47 m. A. M. Jupiter rises on the 1st at 11 h. 16 m. P. M. On the 31st he rises at 9 h. 9 m. P. M. His diameter on the 1st is 40″.6, and he is in the constellation Sagittarius.

SATURN

is evening star. He is in quadrature with the sun on the 3d, is then on the meridian about sunset, and finely situated for observation. He may be found in the west when it is dark enough for the stars to come out, slowly approaching Regulus in the handle of the Sickle, but his light grows dim as he approaches the sun. Saturn sets on the 1st at 1 h. 28 m. A. M. On the 31st he sets at 11 h. 34 m. P. M. His diameter on the 1st is 17″.2, and he is in the constellation Cancer.

MERCURY

is evening star. He reaches his greatest eastern elongation on the 24th, and is 22° 49′ east of the sun. He may be easily seen at that time, and for a week before and after, by the unaided eye. Observers will be sure to find him, for his position is most favorable. He sets on the 24th about two hours after the sun. Those who desire to find the shy planet must command a clear view of the northwestern horizon, and commence the search three-quarters of an hour after sunset. Mercury will not fail to appear about 5° north of the sunset point, as a bright star with an intense luster. An opera glass will be an aid in finding him. Mercury sets on the 1st at 7 h. 28 m. P. M. On the 31st he sets at 8 h. 57 m. P. M. His diameter on the 1st is 5″.2, and he is in the constellation Aries.

MARS

is evening star. As he moves westward from the sun he meets Mercury moving eastward. The planets are in conjunction on the 5th. Neptune overtakes and passes Mars on the 12th. Mars sets on the 1st at 7 h. 53 m. P. M. On the 31st he sets at 7 h. 40 m. P. M. His diameter on the 1st is 4″, and he is in the constellation Taurus.

NEPTUNE

is evening star until the 22d, and then morning star. He is in conjunction with the sun on the 22d, rising and setting with the sun, and passing to his western side. Neptune sets on the 1st at 8 h. 23 m. P. M. On the 31st he rises at 4 h. 9 m. A. M. His diameter on the 1st is 2″.5, and he is in the constellation Taurus.

URANUS

is evening star. He sets on the 1st at 4 h. 1 m. A. M. On the 31st he sets at 2 h. 2 m. A. M. His diameter on the 1st is 3″.8, and he is in the constellation Virgo.

Mercury, Mars, Saturn, and Uranus are evening stars at the close of the month. Venus, Jupiter, and Neptune are morning stars.

Salt Beds in New South Wales.

The Sydney *Daily Telegraph* says: What may be a discovery of great value has been made at Ellalong, near Maitland, and about 16 miles from Allandale station. There a deposit of crystallized salt, 4 feet thick in places, has been found, and it is expected that a body of rock salt will be reached below. Mr. Hilton, an expert, expresses the opinion that a similar deposit will be discovered at Ellalong. Something like 100,000 tons of salt per annum are used there, and the price is 5*l.* 10*s.* per ton. Thus, such a discovery would be of great value. A syndicate has secured 400 acres of the land, and the value of the latter will be thoroughly tested.

A French Locomotive Works.

[SPECIAL CORRESPONDENT OF THE SCIENTIFIC AMERICAN.]

LONDON, March 22, 1889.

Through the kindly interest of Mr. Bailly Blanchard, the U. S. Commissioner at the Paris Exhibition, I obtained letters of introduction from M. M. Coutauren to Mons. Kerournes, superintendent of the principal works of the Chemin de Fer du Nord, at Hellemmes, near Lille, and visited those works on my way home from Paris. I found there much of great interest, and am under obligations for the kindness with which I was received and the complete facilities afforded me in investigating the workshop methods.

I stated in my letter of January 17 that, so far as I could then see, French engineers had, like the English, failed to fully perceive the boon that American engineers had given to machinists in the milling machine and the emery wheel. This statement I must now modify to a certain extent, inasmuch as at the works in question I found more milling machines and fewer planing machines than I have ever seen in any other similar shop, not excluding the Baldwin Locomotive Works or the Pennsylvania works at Altoona, and larger milling machines than I have seen anywhere, save, perhaps, the large machine built by Bement & Miles, or that designed by Professor Sweet for the Straight Line Engine Works, at Syracuse, which, I learn, is going to be built and put on the market by the Pratt & Whitney Co., of Hartford, Ct. The French machines are, however, of a different construction, having a main frame much resembling that of a slotting machine, and in many cases a work table with feeds similar to that of a slotting machine—the only machine of this kind in the United States, as far as I know, being in the Bliss works, in Brooklyn, N. Y. In the works at Hellemmes, however, there is one machine that finishes all the work on a locomotive cylinder complete.

Now the fact of using milling machines in place of planing machines does not prove that it is economical to do so; and as the question of the relative economy of these two machines has been much discussed of late in the United States, I may say that, judging by the quantity of machinery in comparison to the amount of work being done in the shop, milling machines must be very much more economical than planing machines. Indeed, I was surprised to find the smallness of the machinery part as compared to the size of the works. It may be explained, however, that the wheel department was separate, and there were more machines in the erecting shop and boiler shop than is usual. But the main fact remains, viz., that the milling machine has displaced the planing machine here, and, to my mind, with very great advantage. There is, indeed, I believe, but one planing machine in the whole of the works.

I am inclined to believe that this type of machine (*i. e.*, with the slotting machine style of frame) is of French origin, and it will be interesting to ascertain (as I mean to do) how long it has been used in France, for I gather that the honor of having invented the milling machine is not entirely conceded to American machinists. But there are milling machines and milling machines, and I do not suppose that there is any well posted machinist who will dispute the fact that the Brown & Sharpe and Brainerd machines are unequaled, in their respective fields, by anything that has been produced on this side of the Atlantic, and that the fields they occupy are those that have made the reputation of the milling machine. But when it comes to the largersizes of machines, the United States does not so clearly maintain its superiority; or at least that is the impression one receives after seeing the large machines at John Elder's, on the Clyde, and the machines at Hellemmes. Those who consider that a frame carrying a cone and live spindle for driving the cutters and a self-acting feed table with two notch plates for index wheels constitutes a complete milling machine claim the honor of its invention for England.

Whitworth made, years ago, a milling machine of the kind known in the United States as the Lincoln pattern, but whether he copied or was copied I have not as yet been able to determine. But there is one thing I do know, and that is that the Whitworth Co. do not thoroughly understand the modern milling machine, or they would not make the style of nut milling machine they do, with its two separate heads with removable tools in them. There is in the S. E. R. works at Ashford, Kent, a milling machine with a box frame carrying a live spindle with convenience for mills or cutters at each end and a self-acting feed for both. How old this machine is I do not know, but it has been at work since 1849, to my knowledge, but on nuts only, and has none of the spiral feed motions or other fixtures that are the life of the American milling machine.

Most of the lathes at Hellemmes are of French make, but made by an Englishman, and while solid enough, possess some very awkward features, which will be pointed out at a future time.

Locomotive fireboxes are here made of copper, and the firebox stays are also of copper. In cutting the threads on these stays the pitch was found to alter, it was stated to me, on account of their getting warm from the cutting operation; but this I believe to be an error, and that the causes in such cases are due to the longitudinal strain caused by cutting the thread. The machine used for this purpose possesses a peculiar feature, which I only remember to have seen once before applied to a screw-cutting machine, and that many years ago, the principle being as follows: The work-driving part of the machine corresponds to a lathe head, and the dies are carried in a sliding head taking the place of a lathe tailstock. On the live spindle, in place of a live center, is a long hob, corresponding to those used on an American Fox lathe and having a similar guide arm, which is attached to the die head, so that the hob acts as a lead screw, forcing the die head to travel at the right speed for the pitch of thread being cut. There is no doubt that a device of this kind is necessary whenever long screws or square-threaded ones are to be cut.

A blunder is committed in this machine that has been very thoroughly exposed in the United States, and that there does not seem much excuse for, considering the attention that has been called to it in the past. I refer to the putting of three chasers in the head instead of four. As this machine is of English make, however, it is not fair to charge French practice with its errors. Curiously enough, the taps have four plates, but the company make their own taps, and, indeed, have their own thread, there being no standard in France.

One or two things with reference to the lathe work struck me as remarkable. For example, I saw no universal chucks, the chuck plates having round holes in them, into which fitted movable dogs. One or two lathes had turret heads, with the usual complement of tools, but there were no stop motions to them, and as a result the workman went on measuring for each cut just as he would have to do without the turret, which, I may observe, was placed on the top of the slide rest. I saw the same thing done in an English shop, and so suppose it is a regular thing here, but do not see why so much of the advantage of the turret should be lost for the mere want of a stop motion.

My curiosity was aroused to find on the smaller lathes, say up to 24 inch swing, long-handled hand tools, and I waited some time to see what they were used for. At last I found that, to take the finishing cut, these hand tools were used in connection with the automatic feed of the lathe, being merely held in the hand and resting on the roughing tool while fed automatically, the idea being, no doubt, to save taking out the roughing tool to resharpen it for every finishing cut. I am bound to say that, so far as I could see without examining the work, the men seemed to get along very well this way, but I have no hesitation in saying that it is not a commendable practice, as more parallel and true work will certainly be got by a rigidly held slide rest tool.

I have stated that most of the lathes were of English pattern, but there was one of the large lathes with raised V's after the American pattern, which, like a good many other things, is claimed here as an old English and discarded style. All the screw-cutting lathes had a ratchet feed and release arrangement for use in regulating the depth of cut and withdrawing the tool on the back traverse, such a device having been illustrated in the SCIENTIFIC AMERICAN in 1877, having been found on a lathe at the Rogers Locomotive Works, in Paterson, N. J.

Emery grinding machines are used for the mills and cutters, these machines having been designed at the works. The tools look well sharpened, and were evidently hardened right out, and not lowered in temper at all. They had evidently, however, been quenched in oil, for if quenched in water they would have been whiter. The cutter grinding machine is not as well designed as similar machines are in the United States, and yet, from the number of large milling machines, and the variety of work they were applied to, the works will compare favorably with any other works I have yet seen anywhere. The new machines that are to be exhibited at the International Exhibition I am not to describe at present, but I can say that one of them applies the emery wheel in a way that is, I believe, original, and that is certainly good.

In the wheel shop I noticed a lathe that, while it drove the axle from the middle, as is done in the axle lathes of the Niles Tool Works and of Wm. Sellers & Co., yet had no tail stocks or dead centers; but the work was steady, nevertheless, and cuts of one-half inch deep were being taken off. Two men, one on each end of the axle, were working at this lathe. I also noticed that in turning up the journals of axles that had the wheels on, a split pulley was put on the axle to drive it by, so that both lathe centers were dead centers, and the truth of the journals was, therefore, independent of the truth of the live center of the lathe, and this is an excellent idea.

A machine for grinding up guide bars was constructed to use what may be called cupped emery wheels (corresponding in shape to those in use in some of the planer knife grinding machines in the United States). Wooden wheels, covered with coarse emery, were used, but I do not think this machine anything like equal to the American style, where the bars or work rests on the face of a table through a groove in which the perimeter of the emery wheel projects to an amount equal to the depth of the cut, and the bar is merely slid along the table over the wheel, because when, as in the French machine, there is a feeding mechanism to the machine, there is a want of solidity and a chance for lost motion.

The drilling machines call for no especial notice, except one that was used to drill ¼ inch holes through copper stays about 6½ inches long. The machine was belted to run about 800 revolutions per minute on what may be called the Sellers system, the belt passing over guide pulleys to a pulley fast on the drill spindle, thus getting the requisite speed without the use of gearing; and this is undoubtedly the best way to drive a drill, when it can be done, or in other words, to drive drills of moderate diameters. The stem of the drill passed through the somewhat flattened end of a pipe conveying the soap water, which passed down the stem of the drill to the cutting end, which was about $\frac{1}{16}$ inch larger than the drill stem and shaped like a very keen twist drill, the twist end not being over ¼ inch long. The feed was given both by hand and foot at the same time, and it took, on an average, 70 seconds to drill one stay, which I call good work.

Another machine worth calling attention to was one for truing up the sliding faces of axle boxes, which was done by a cupped emery wheel similar to that described with reference to the guide bar grinding machine. This, however, I think a more desirable form of machine for its purpose. The emery used on these two machines was very coarse—about as large, say, as No. 6 gun shot, or perhaps larger.

An item of much interest on the emery grinding machines was the means of lubricating the journals, which was as follows: A soft yellow grease was used, in a closed cup, the end of a screw abutting against the grease, so that when you gave the screw a turn it forced the grease by main pressure upon the journal. This is said to work excellently well, and I was informed that it was proposed to try a similar device upon the axle boxes of a locomotive. I should think it likely that such an axle box would, however, require a more continuous supply of lubricant than this would give.

I did not see a parallel vise throughout the whole shop, and although I am not an advocate for that class of vise for heavy work, still they are very handy indeed for medium sized work.

In the boiler shop I found them using Kennedy's (American) spiral punches, and using rope belts for drilling in any position on the boilers and for tapping stay holes, etc., these arrangements being very complete.

Taking these shops as a whole, they compare favorably with either American or English shops, and are well worthy of a visit.

JOSHUA ROSE.

To Protect Trees from Borers.

Last year, says the *Rural New-Yorker*, we briefly alluded to the simple method employed by our neighbor Augustus J. Hewlett, to protect his apple and peach trees against the borer. It has led to so many inquiries that it may be well perhaps to speak of the method more in detail. Fruit growers all know that tarred paper about the trunk is harmful to it. Laths, etc., tied about the trunks are not altogether satisfactory. Mr. Hewlett's mode reduces the labor and expense to a minimum and seems thoroughly efficacious, as he has practiced it for over 20 years. White lead and raw linseed are mixed as for ordinary outside painting, though a somewhat smaller proportion of the lead suffices. With this mix enough cheap mineral paint and lamp black to imitate closely the color of the bark. The young trees should be painted in the spring just as soon as transplanted and every year thereafter in early May. The paint is applied from a little below the soil to a foot above. In four or five years the bark will peel off after the paint has been applied. When this excoriation occurs, if before July, it is best to remove what bark still clings and at once give another coating of the paint. The new bark underneath will be found bright and healthy, showing that the paint does no harm. Mr. Hewlett painted some apple trees every spring for 15 years or more. The painting was discontinued for several years, as he thought there might be no occasion for further painting. These trees, however, were at once attacked by borers, and several were found six inches above the entrance. Peach trees are painted in the same way. He has never had a tree injured by borers if they were regularly painted.

The editor of the *Rural New-Yorker* adds that Mr. Hewlett is a careful, conservative farmer and his statements may be accepted as fully trustworthy.

A New Apparatus for Firemen.

From April 1, 1889, Paris firemen will be provided with cylinders of oxygen under pressure, to be used for the prompt relief of persons suffocated during fires. The oxygen will be added to the regular supply of medicines always at hand in case of accidents.