THE ENGLISH TELEGRAPHS.

BY GEORGE B. PRESCOTT.

CONSTRUCTION OF THE LINES.

The construction of the English telegraph lines is uniformly excellent, and reflects great credit upon the Engineering Staff, in whose hands it is placed.

The timber used for poles is generally larch treated with sulphate of copper, or red fir creosoted.

The creosoting is accomplished by the Bethel process. The poles are placed in an iron receiver and the air exhausted from them, after which boiling creosote oil is forced into them by pressure. This process greatly increases the durability of the wood, pine and spruce being thus rendered as lasting as cedar. The odor of creosoted poles in some places is said to be offensive, but no objection is raised against them in England on this account.

The poles are never creosoted until they have been stacked a sufficient length of time to be thoroughly dry.

The cost of creosoting includes a certain margin for loading into trucks, or on board a ship, which is always stipulated for when the contracts are made.

It sometimes happens that a parcel of poles are exceptionally dry, in which case they are given an extra two pounds of oil per cubic foot, costing from six pence to eight pence per pole additional.

When poles are used, which are neither prepared with sulphate of copper nor creosote, they are well seasoned, and then painted, the butt ends being slightly charred from the bottom to a foot above the ground line, and tarred.

The cross-arms are made of English oak, two inches thick and twenty-four and thirty-three inches in length, and are placed alternately on either side of the pole. A twenty-four inch cross arm is placed on the front of the pole a foot from the top, and then a foot lower down a thirty-three inch cross arm is placed on the back of the pole, and so on. In some cases as many as seventeen wires are carried upon a single line of poles of twenty-five feet in length, and no cross arm carries more than two wires, except on the double pole lines, where seven feet cross arms are employed, and four wires are supported upon each cross arm.

All the poles are provided with earth wires, or contact conductors for carrying the wet weather escape directly to the earth, instead of permitting it to leak into the neighboring wires. The earth wire consists a piece of No 8 galvanized iron wire, extending from the top of the pole to the bottom, and terminating in a flat coil attached to the foot of the pole, so as to expose as large a surface as possible to the earth. From the thick earth wire, branches, composed of No 10 galvanized iron wire, are carried in saw grooves sunk in the cross arms, and soldered to the insulator bolts. The work is performed at the factory before the cross arms are carried out on the line. The earth wires sometimes project above the top of the poles, and serve an excellent purpose as lightning arresters.

Great care is taken to keep the poles in a rigidly upright position; and in addition to placing them well in the ground and tamping the earth thoroughly around them, they are well supported with stays made of wire ropes attached to iron rods, which run into the ground about four feet. On straight lines and slight curves, where exposed to the winds, double stays are employed.

INSULATORS.

The insulators on the railway routes are uniformly of the Varley double cone brown ware pattern, and those upon the canals and highways of the single cone white ware, or porcelain. The Varley insulator is regarded as the best, but its greater cost has prevented its exclusive use.

THE CONDUCTORS.

The conductors employed upon the English lines are composed of zinc-coated iron wires of Nos. 4, 8, and 11 gage. The No. 8 gage—0·170 inch diameter—is the size in general use: the No. 4 gage—0·240 inch diameter—being employed upon a few of the long circuits between the more important points, while No. 11—0·125 inch diameter—is used for short lines only.

The method formerly followed of allowing the wires to pass freely through the insulators, and fastening them only at distances of half a mile, has been abandoned in favor of binding them at every pole, No. 16 charcoal wire being used for binding.

JOINTING THE WIRES.

Great care is observed in the jointing of the wires, which is invariably performed upon the line, no joints by the wire makers being permitted. The joint exclusively adopted is that known as the Britannia joint. This is made by slightly bending the ends of the two wires and placing them side by side for a distance of three inches, and binding them tightly together with No. 19 wire, and soldering them thoroughly. All joints are required to be soldered, whether the wire be old or new, galvanized or plain. The leading-in wires at the offices are insulated with gutta percha, covered with linen tape and varnished with a preparation made of linseed oil and Stockholm tar. These wires are re-tarred from time to time to prevent decay.

THE OVER HOUSE WIRES.

The over house wires are erected in spans, supported by iron poles attached to cast iron saddles, which are fitted at the ridge of the roof. The poles are light and well stayed by wire ropes. In London, cables containing 50 insulated wires are suspended by hooks from No. 8 iron wires, carried in the manner described above. The conductors in these cables consist of No. 22 copper wire.

At Newcastle on-Tyne, a strand composed of seven steel wires, of No. 16 gage and 454 yards long, is suspended over the Tyne, and supports a cable containing fifteen conductors. The cables rest upon ebonite chairs attached to the rope by means of rings placed at distances of 12 feet apart.

The over house wires are used principally for lines which are leased by the Post Office Department to private firms or individuals for the transmission of messages on their own special business between offices, factories, etc., and which make a system of nearly 5,000 miles.—*Journal of the Telegraph.*

The Chemical Classification of Iron.

M. Frémy, an eminent French chemist who has recently been studying further into the metallurgy of iron and steel, thinks that it would be of much more advantage to founders and metallurgists if commercial iron, which is still classed according to its physical properties, should be known with reference to its chemical characteristics, that is to say, in accordance with the very small quantities of carbon, sulphur, phosphorus, etc., which it may contain, and which chemical analysis would reveal. This chemical classification has for some time past been in use in Krupp's celebrated foundery, where, in fact, nothing is left to chance. Chemists constantly analyze the crude materials and the fabricated products. The scientific and industrial element is intimately connected with the military. Artillery officers examine the manipulations and follow their every detail. Considerable sums are devoted to new experiments, made on the different alloys which may be suitable for cannon, and of each metal tried there is compiled a record which indicates its chemical composition, its advantages, and defects.

According to M. Frémy's investigations, it appears that the best metal for guns is neither iron nor steel, but some combination of both.

New Street Railway Locomotive.

A trial recently took place on the Manchester, Sheffield, and Lincolnshire railway, between the Grange Lane and Tinsley stations, of a tramway engine, constructed by the Yorkshire Engine Company, upon L. Perkin's patent system, for the Belgian Street Railway Company, Brussels. The novel features of this engine consist in its not emitting any smoke or steam into the atmosphere, and making comparatively little noise. The engine used steam at 500 lbs. to the square inch, and maintained this pressure by natural draft without any difficulty. The engine is compound, and expands the steam to the most economical limits, and then condenses it by means of two air surface condensers placed one on either side of the machine. The engine can be driven from either end, all the driving gear being duplicate to obviate the necessity of turntables. The engine accomplished a speed of fifteen miles per hour, drawing its full load up gradients varying from 1 in 200 to 1 in 80.—*Iron.*

Ballooning Extraordinary.

We recently published a note of Mr. Croce-Spinelli to the French Academy of Sciences, in which he indicated the belief that existence could be maintained at very high altitudes by aeronauts, if they should provide themselves with cylinders of oxygen, to be breathed in the highly rarefied atmosphere. M. Spinelli and Sivel have lately demonstrated the truth of this view by ascending in the *Etoile Polaire*, a balloon of 98,840 cubic feet capacity, to the immense elevation of 25,841 feet without inconvenience. The barometer level descended 11·7 inches, showing the above altitude, which is higher than that obtained by Gay Lussac and nearly equal to the point reached by Glaisher in his famous ascension. The thermometer at minimum marked 7·6° below zero Fah. The aeronauts, having taken with them all necessary instruments, made a number of valuable observations which, we learn from *Les Mondes*, will shortly be communicated to the French Academy.

Rain Cannonades.

Mr. Edward Powers petitions Congress to authorize a series of experiments to produce rain by artificial means, during dry seasons. This, he points out, may be accomplished by the firing of heavy artillery. In back numbers of the SCIENTIFIC AMERICAN, we have given many specific examples of rain storms which have followed heavy cannonades, in connection with various battles, during the late rebellion and European combats. There is reason to believe that the concussions of artillery, when sufficiently long continued, may have a condensing or aggregating effect upon the aerial vapors, and so induce the fall of rain. When the national debt is paid, or specie payment resumed, we think it might be well to burn some public powder as suggested by the present petitioner. But we move that the experiments be postponed until then.

A Chance for Investors.

The attention of parties desiring to invest in patents is directed to the announcement of Messrs. F. A. Hull & Co., manufacturers of the Danbury drill chuck, published in our advertising columns. This invention was fully described and illustrated on page 214, Vol. XXIX. of the SCIENTIFIC AMERICAN, and is a three-jawed lathe chuck so constructed that all the jaws are simultaneously moved, in radial directions, by the revolution of a single right and left hand screw. The action is direct and positive, and, it is claimed, cannot clog, set, or in anywise get out of order.

We are informed that, since the placing of the article upon the market, it has met with a ready sale, and has given general satisfaction. The owner, desiring to dispose of the patent in order to devote his efforts to a more important enterprize, offers the same at quite a moderate price. Judging from the representations of the manufacturers, we presume that any one, having the requisite capital, will find the investment highly profitable.

THE ST. LOUIS BRIDGE.—The iron work is now complete, two weeks in advance of the contract time. A grand banquet has been given by the Keystone Bridge Co., contractors, to their employees, some 200 in number, at the Grand Central Hotel. The approaches will now be hastened to completion, railroad tracks laid, and carriage ways finished as speedily as possible; and the indications are that the bridge will be thrown open to public traffic at a much earlier day than was anticipated.

Recent American and Foreign Patents.

Improved Stone Pavement.

Andreas Eichenberg, Columbus, Ohio.—This invention is an improvement in stone road beds, and consists in arranging an upper vertical layer with a horizontal layer of flat stones. Both break joints to insure a greater degree of stability of the individual pieces in their normal position. Sand or gravel is used to fill the interstices.

Improved Belt Shifter.

Harrison W. Curtis, Philadelphia, Pa., assignor to Joseph L. Ferrell, same place.—This invention consists of an arrangement of the idle pulleys used for turning a driving belt out of a right line for a belt shifter by mounting them on a swinging frame in a line cutting the center of the angle between the two lines in which the belt runs.

Improved Grain Tally.

George P. Fitts, Jacksonville, Oregon.—A carriage moves forward and backward on guide rails between stop pins. A measure is retained in position on the carriage by pegs, and placed under the spout of the threshing machine, passing under cross bars for equalizing the grain in the same. The attendant moves the carriage in one direction, when one measure is filled, and empties the same while the other measure is filled from the spout. He then moves the carriage back, taking off the second measure when full, and repeats this operation, a registering device keeping a correct tally of the grain measured off, forming thus a very convenient self-acting apparatus for counting the number of measures.

Improved Thill Coupling.

J. Russell Little, Jamaica Plains, Mass.—This is an improved coupling for connecting thills or a pole with the axle of a carriage. A retainer, which is a small bar of iron, the ends of which work in slots formed in the yoke of an axle clip, when pushed into the forward ends of its slots, comes so far over the hook head of the thill iron as to prevent the said thill iron from being raised from the bolt. The retainer is held forward by a spring, which will allow it to be pushed back when it is desired to attach or detach the thills or pole.

Improved Bobbin Winder for Sewing Machines.

Moses Cook and Moses G. Cook, Ashfield, Mass.—This invention consists of a traverse mechanism for a bobbin winder for sewing machines, in which a drum with a reversing cam groove for working the traversing guide forward and back along the spool has the necessary slow motion imparted to it by a pawl and a friction griping strap. The pawl is worked by an eccentric on the bobbing turning shaft, which receives motion from the sewing machine wheel by a friction wheel. An adjusting screw regulates the extent of the pawl's movements so as to turn the drum fast or slow, according to the size of the threads, and the drum has a friction strap and spring for holding it when released by the griping spring. The bobbin has a spring on its spindle for fastening the thread to it at the beginning. The spool holder has a tension spring to regulate the unwinding of the thread from it.

Improved Combined Gang Plow, Cultivator, and Chopper.

John J. Watrous, West Point, Ga.—This invention has for its object to furnish an improved machine which may be readily adjusted for breaking up and bedding land, and for cultivating and chopping the crop. By suitable construction no tongue is required, which enables the machine to be turned in a very small space, and the chopper is operated by its advance. The chopping hoes may be conveniently adjusted to work deeper or shallower in the ground, as may be desired. The chopper may be easily raised from the ground, and thus prevented from working, and, when not required for use, may be detached. The plows may be adjusted to work shallower or deeper in the ground. Any desired number of plow beams may be used according to the kind of work to be done. Suitable construction also allows the rear ends of the plow beams to have a free vertical movement.

Improved Pitman.

George L. Jones, Vanville, Wis.—This invention consists in a pitman having a side-notched eye at each end, and a collar bushing combined with a pin secured at both ends by a nut. By this construction, a washer and the eye of the pitman can be forced farther upon the pins to take up the wear, by screwing up the nut.

Improved Machine for Making Animal Shoes.

William Hamilton, Fallsburg, assignor to James L. Lamoree, Grahamville, N. Y.—This invention consists of an anvil, trip hammer, and two side hammers, for hammering the shoe on the sides and edges. The anvil is flat on the top, and the hammer has a face which is the same form in outline as that of one side of the shoe to be made, but wider, so as to insure the hammering of the upper side of the blank over all its surface. The hammer is also beveled or inclined to vary the thickness of the shoe and produce the requisite shape for the top. One of the side hammers is shaped in respect of the contour of its face to correspond with the required shape for the outer edge of the shoe; the other is shaped to correspond with the inner edge, and both rest on the face of the anvil, and work toward and from each other to hammer the edges of the blank. These hammers perform their operation while the trip hammer is raised, and then move out of the way when the trip hammer falls, to give the necessary space for it between them which is required by the greater width of the hammer than that of the blank. The side hammers are operated by the helve of the trip hammer, one being connected directly to an arm projecting from its axis by a rod or shank, so as to be thrown forward when the hammer rises, and the other being connected to the same arm by a similar rod, and an intervening rock lever, by which it is moved toward the other side hammer by the same operation of the trip hammer. A bar is arranged on the trip hammer helve, to be acted on by the tappet wheel for raising the hammer, which said bar is jointed to the shank, and arranged to swing out of the path of the tappets to throw the hammer out of gear, and into their path to put it in gear again.

Improved Adjustable Catch for Latches.

George W. Burr, East Line, N. Y.—This invention is an improvement in the class of catches for door and gate latches, which are made vertically adjustable to accommodate the various positions the door or gate may assume in consequence of shrinkage, swellings, or other cause. The invention consists in combining a T-shaped catch with a slotted holder or guard plate, which is secured to the gate post by screws, so that by means thereof the catch may be clamped and held by friction at any desired point.

Improved Corn Plow.

Jeremiah H. Trout, Kingwood, assignor to himself and Isaac S. Cramer, Sergeantsville, N.J.—The shovel standard is made in two parts and jointed to allow an outward lateral movement to the lower part, with a spring on the outside and a lever on the inside. The draft bars, which are attached to the frame and run along through slots in the plow stocks, are connected to the stock by wooden pins, which are prepared, in respect of their strength, so as to break readily if the plows encounter too great resistance. The stocks are pivoted to the frame, so as to swing back in case the pins break.

Improved Ice Machine.

Thomas F. Peterson, Macon, Ga.—This invention consists of a boiler, condensing coil and cooling tank, receiver, freezing coil and tank, and pumps, all combined and arranged so that the ammoniacal gas expelled from the boiler by heat is compressed and condensed in the condensing coil, and then, after passing through the receiver, is let into the freezing coil, so as to expand therein and freeze the water in the tank by taking up the heat from it. It is then pumped directly into the boiler again for repeating the process, and takes with it the heat obtained in the freezer, and thus utilizes it instead of wasting it.