

THE ALBERT IRON BRIDGE.

The Albert Suspension Bridge, over the river Thames, at Chelsea, London, was designed by Mr. R. W. Ordish, upon his rigid suspension principle. It is 710 feet long, with one center span of 400 feet, and two side spans of 155 feet each, the roadway being 71 feet wide between the parapets. The appearance of the structure is seen from the annexed engraving, Fig. 1, and one of the piers, with the tower and a cross section of the roadway, is also shown on a larger scale in Fig. 2.

Each river pier is formed of two concrete columns within cast iron cylinders, placed 53 feet 6 inches apart from center to center. At base the cylinders are 21 feet diameter, 4 feet 6 inches deep, and 1½ inches thick. Above the conical pieces, P, Fig. 2, the cylinder is 15 feet diameter, made in lengths of 6 feet, and 1½ inch thick. As the iron cylinders have no permanent load upon them, no exact bearing is required in the joints, which are, therefore, not faced.

A joint, formed of hemp wrapped on hoop iron, was found sufficient to compensate for irregularities in the castings, and to keep out the water in the process of sinking. The cylinders were forced down by dead weight, through eight feet of gravel and one foot of sand, into the London clay, the excavation being carried on within the cylinders as they sank. The clay, when pierced to a depth of ten feet, was found sufficiently hard for a foundation, and upon this the concrete was deposited. This concrete is made of shingle, sand, and Portland cement, and at base the cement forms one third of the mixture, the proportion being reduced with successive layers of concrete to 1 in 7 at the top. Within a week of the columns being completed the concrete became as hard as stone, affording ample strength for the load of about seven tons per square foot which comes upon it. The two columns forming each pier are united and stayed by the lattice girder, B. Upon each concrete column an octagonal base plate, C, 11 feet 6 inches diameter, 2 feet 2 inches deep, and weighing 20 tons, is placed, the upper surface of the base plate being faced in the lathe to receive the superstructure of the towers. The towers are made entirely of cast iron, successive tiers of columns being united at intervals by large octagonal castings. The castings, D D, are constructed as saddle plates for the main chains, and smaller saddles, E E, above receive the catenary wire rope. The height from the bottom of the cylinders to the top of the concrete column is 30 feet, and thence to the upper saddle 70 feet 6 inches.

The platform is composed of two lines of plate girders, G G, 7 feet 6 inches deep, with bottom flanges 16 inches wide, and top flanges 9 inches wide. At intervals of 8 feet, cross girders, K, 2 feet 6 inches deep, are riveted to the main girders, and stiffened by longitudinal girders or distance pieces, H. The roadway is formed of fir blocks 4 inches deep, laid on longitudinal fir planks 7 inches deep.

It will be seen from the cross section of the bridge that the plane in which the chains lie is inclined, and that the web of the main girder lies in the same inclined plane. By this arrangement, the entire width of the platform is kept within the opening of the towers, and the roadway is not contracted at the towers, as is the case where the attachment of the chains to the platform is perpendicular to the saddle.

The anchorage for the chains and the catenary is formed in a peculiar manner within an iron structure, and is perfectly independent of the great mass of masonry generally employed. It consists of a cast iron cylinder, 20 feet 6 inches deep and 3 feet internal diameter, enlarged at the bottom into a chamber 5 feet diameter, for anchoring the chain. This cylinder is water-tight, and provided with a man hole and steps, so that the anchorage can be examined at any time, and cleaned and painted when necessary.

The bridge is calculated to carry, with a strain of 5 tons per square inch on the chains and 9 tons on the steel wire, a moving load of 70 lbs. per square foot. The headway for vessels below the platform varies from 21 feet to 38 feet, according to the tide. The weight of iron work in the bridge is 1,530 tons. We are indebted to Iron for these illustrations.

To Impart to Coarse Wood the Appearance of Polished Mahogany.

The following process is recommended in *Wiederhold's Trade Circular*: The coarse wood is first coated with a colored size, which is prepared by thoroughly mixing up, in a warm solution of 1 part of commercial glue in 6 parts of water, a sufficient quantity of the commercial mahogany brown, which is in reality an iron oxide, and in color stands

the hand. Having ascertained in this way the right condition of the size color with respect to tint and strength, it is then warmed slightly, and worked through a hair sieve by means of a brush. After this it is rubbed upon the wood surface with the brush, which has been carefully washed. It is not necessary to keep the color warm during the painting. Should it become thick by gelatinizing, it may be laid on the wood with the brush, and dries more rapidly than

when the color is too thin. If the wood is porous and absorbs much color, a second coat may be laid on the first when dry, which will be sufficient in all cases. On drying, the size color appears dull and unsightly, but the following coat changes immediately the appearance of the surface. This coat is a spirit varnish. For its production 3 parts of spirits of wine of 90° are added in excess to 1 part of red acaroid resin in one vessel, and in another 10 parts of shellac, with 30 parts of spirits of wine of 80°. By repeated agitation for three or four days, the spirit dissolves the resin completely. The shellac solution is then poured carefully from the sediment, or, better still, filtered through a fine cloth, when it may be observed that a slight milky turbidity is no detriment to its use. The resin solution is best filtered into the shellac solution by pouring through a funnel loosely packed with wadding.

When filtered, the solutions of both resins are mixed by agitating the vessel, and letting the varnish stand a few days. The acaroid resin colors the shellac, and imparts to it at the same time the degree of suppleness usually obtained by the addition of Venetian turpentine, or linseed oil. If the varnish is to be employed as a coat, the upper layers are poured off at once from the vessel. One or two coats suffice, as a rule, to give the object an exceedingly pleasing effect. The coats dry very quickly, and care must be taken not to apply the second coat till the first is completely dry.

Profits of Co-operation.

Some eight or ten years ago, Joseph D. Holmes, Charles Jordan, and William Millard, three young farmers living almost within a stone's throw of each other, decided to join in establishing a dairy milk route from their farms to Pawtucket, R. I., some six miles away. Neither farm was large enough to sustain a route alone, but the three together could do it easily. Neither wanted to take the place of a middleman and do all the marketing, nor did either wish to give up his business to a middleman. So they agreed that each should take his turn on the milk wagon.

The milk accounts are all kept in one book, and the buyers at the village settle their bills by this book, whether it comes by one or another of the members of the company. Each of the three men goes with the wagon every third day in regular order, unless, for accommodation sake, one goes a trip for one of the others. Each uses his own horse and wagon, and each knows the amount of milk that is taken from the different farms every day.

The two trips that each one makes every week enable him to market most of his other produce, such as apples, potatoes, sweet corn, tomatoes, and other garden products, of which each one raises considerable quantities, without making special trips for such purposes. Nor is there any hitching up and going to the store for purchase; all the buying, as well as selling, being done on their regular market days; and they are all in daily communication with the post office, which is no small convenience to farmers.

Under this system of partnership the cost of marketing is reduced to the minimum, while each bears his just proportion of the expenses, and receives equal share in all the advantages of the combination. Since this arrangement has been established, all their farms have been really enhanced in value. The young men have increased their stock, and it is better fed and better housed. Buildings have been repaired and enlarged, more and better tools purchased, and the land is constantly increasing in fertility and productiveness. But little complaint is heard from them about hard times for farmers. They pay their bills, take the papers, and know what is going on in the world outside.

We have been familiar with this company from its organization, and believe the example these men have set is worthy of imitation by many farmers who are now grumbling about the cost of getting their goods to market.—*New England Farmer*.

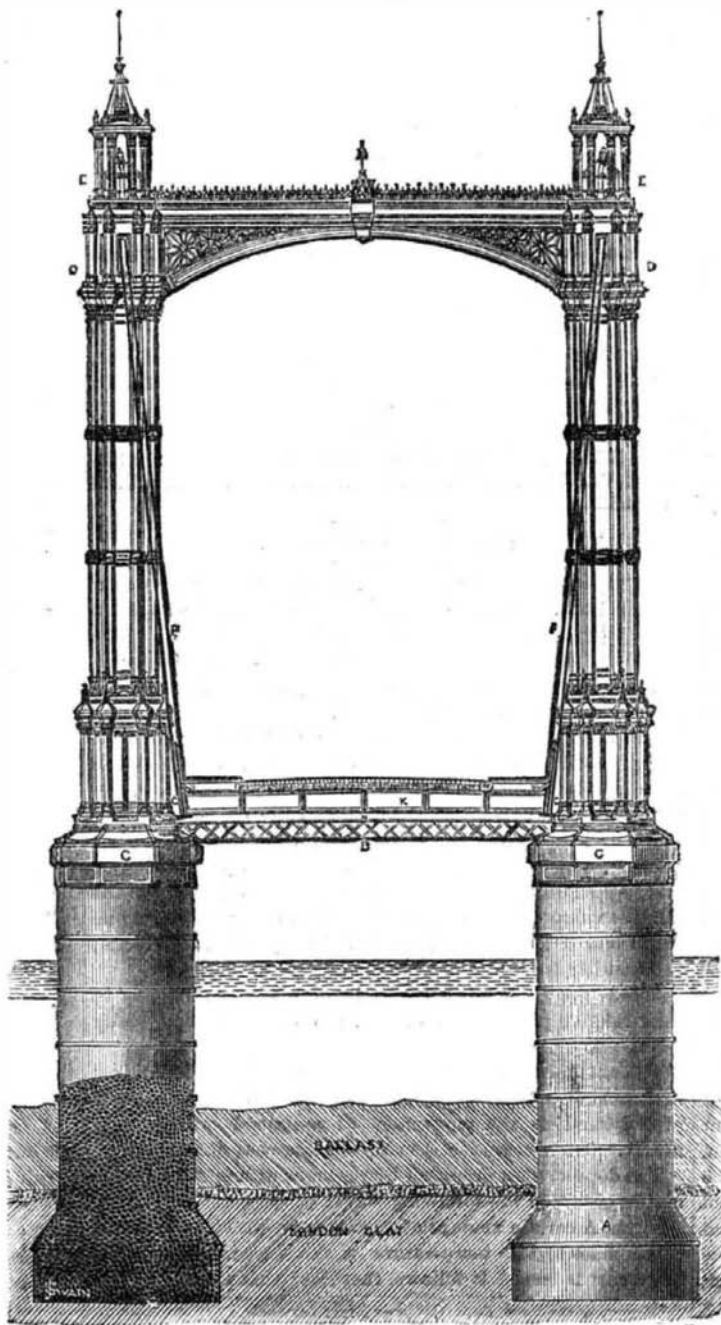


THE ALBERT IRON BRIDGE, LONDON, ENGLAND.—Fig. 1.

between so-called English red and oxide of iron. This is best effected by adding in excess a sufficient quantity of the dry color with the warm solution of glue, and thoroughly mixing the mass by means of a brush until a uniform paste is obtained, in which no more dry red particles are seen.

A trial coat is then laid upon a piece of wood. If it is desired to give a light mahogany color to the object, it is only necessary to add less, and for a darker color more, of the brown body color. When the coat is dry, it may be tested, by rubbing with the fingers, whether the color easily separates or not. In the former case, more glue must be added until the dry trial coat no longer perceptibly rubs off with

Fig. 2.



Patents.—Record of One Week's Issue.

The *Inter-Ocean* of Chicago thus sums up one week's business of the Patent Office, and gives a *resumé* of the subjects patented and the number of patentees from each State. The writer says:

In whatever manner the Cuban difficulty, the President's message, and the assembly of Congress may affect other interests, certain it is that business at the United States Patent Office runs as smoothly as ever, with a fair increase in the number of applications for patents over the average of the past four or five weeks. In case of a war in Spain, there is certain to be a number of applications for patents for new and improved cannon, mitrallenses, monitors, and like death-dealing appurtenances and appliances; but, as yet, there has been no perceptible increase of applications of this particular kind.

There are at present pending in the Patent Office forty-six applications for the extension of patents about to expire. One of these is for the famous Fairbanks platform scales, granted originally December 20, 1859. Another is one of the Woodruff patents for seats and couches for railway cars, which is to be heard on the 7th of January next. This patent is owned wholly in Chicago. Two extensions were granted during the past week, both controlled by the same parties, and both relating to the manufacture of rubber belting.

Six designs were patented and ten trade marks registered; none of these were furnished by Chicago. A St. Louis manufacturing firm registered the words "Golden Crown" in combination with a crown printed in gold, as a trade mark for agricultural implements.

The number of original patents issued for the week is 229, and 11 reissues. The former, as regards the Western and Northwestern States, are divided as follows: Illinois, 12 (of these the city of Chicago comes in for only one patent this week); Indiana, 9; Wisconsin, 6; California, 6; Michigan, 5; Missouri, 5; Iowa, 3; Minnesota, 1; and Nebraska, 1. Wisconsin and California each claim one reissue.

The solitary Chicago patent is taken out by J. A. Roche and G. V. Orton, and is for an improved band-sawing machine. The saw guide, being attached to one end of a horizontal bar which is made vertically adjustable, constitutes the main feature in the invention.

The other Illinois patents are: Stove damper, patented by H. H. Huntly, of Quincy, harvest rake, patented by E. Lippincott, of Brighton; drawbar in draft equalizers for wagons, and clip for wagon axle skeins, both patented by J. M. Orput, of Malta, one half of each patent by him assigned to D. Safford, of South Grove; corn planter, patented by A. Springsteen, of Oquawka; road scraper, patented by J. W. Weston, of Windsor, assignor to J. M. Jackson, of the same place, tyre tightener, patented by Wm. Ballair and

Wm. Ough, of Atkinson; hay press, patented by H. F. Blank, of Liberty, cotton planter; patented by C. H. Nixon, of Polo; binder attachment for harvesters, patented by H. Porter, Polo; and washing machine, patented by J. Trickett, Quincy.

Indiana's new patents are the following: Hay knife, patented by John S. Ball, Mishawaka; car spring, patented by E. T. Russell, Indianapolis; cotton harvester, patented by Wm. H. Pedrick, Richmond, car coupling, patented by Wm. A. Cochran, Flat Rock, assignor to himself and James T. Burch, of the same place; hand corn planter, patented by Eli Rogers, Rochester; process of retouching photographic negatives, patented by S. H. Wright, Terre Haute; bed bottom, S. B. Freeman, Fort Wayne; eavestrough, P. F. Kiblinger, Millersburgh; and plow, James Oliver, South Bend.

Next in order comes Wisconsin, with the following six patents for new inventions: Carriage top, patented by James N. Gill, of Oshkosh; soda water draft tube, patented by Otto Zwietsch, of Milwaukee; butter worker, patented by D. W. Dake, of Beloit; binder's attachment for harvester, patented by Thomas Urdahl, of Cross Plains, assignor to Simeon Mills, of Madison; rotary grain distributor, patented by A. D. Foote, of Berlin; assignor to M. Helmer, of Milwaukee; and revolving stool or chair, patented by J. J. Vollrath, of Sheboygan. The reissue is for a tag holder (patented August 6, 1867), to Thomas T. Bottomley, of Burlington, assignor to Pratt & Letchworth, of Buffalo, N. Y.

California this week has an equal number of patents, nearly all of which are for ore crushers, ingot molds, and similar appurtenances used in the production and refining of the precious metals, which constitute her chief branches of wealth and industry.

Missouri leads off with a steaming mug, patented by A. J. Furr and W. C. Knaus, of Boonsborough. Their mug is provided with a lamp for heating the water, and the detachable soap dish covers the mug and rests in the water. The water pours through an opening into a cup on the outside of the mug, in which the brush may be dipped. The other four patents are: Ice house, patented by A. Wilbur, of Cedar City; churn patented by John P. Friest, of Chillicothe; wash boiler, patented by William H. Hammond, of Syracuse; and a combined table and secret writing desk, patented by Charles Kade, of Lexington.

Michigan claims the following five patents. Stilt, patented by I. S. Sheears, of Ypsilanti; paper holder shelf, patented by George W. Hawkins, of Clayton; sleigh, patented by A. D. De Laro, of Goodrich. In this sleigh, as represented by the model, the rear end of the tongue is mortised into a cross bar, which is pivoted in front of a front beam, the draft in this manner to be applied directly to the front beam. Valve, patented by Charles F. Murdock, Detroit; and a whiffletree, patented by John Parker, of Pontiac, assignor of one half his

right to James A. Hubbs, of Cato, Mich., complete the list for Michigan.

Iowa's three patents are for a kneading board, patented by H. P. Jones, of Davenport; a hub-boring machine, patented by F. Jonas, of Burlington, assignor to himself and George O. Ray, of the same place; and a numerical filing case, patented by George W. Bettesworth, of Cedar Rapids.

Minnesota this week is only represented by the patent of A. G. & H. W. Mowbray, of Stockton, for a middling bolt; and Nebraska by the patent to Tobias Billesbach, of Kearney Junction, for a new method of burning brick.

A party in New York has invented a postal card of peculiar manufacture. It is coated with various chemical salts, and the action between these compounds and the deposit from a metallic pencil renders the writing indelible.

WORCESTER JAPANESE PORCELAIN AT VIENNA.

The English china court at the Vienna Exposition was a department of special attraction. It must have been remarked that public taste, led by the judgment of art connoisseurs in China, has long been directed to the peculiar treatment of ornamental design in Satsuma and Japanese manufacture. The Worcester Works have taken advantage of this taste to design specially for the Vienna Exposition a large collection of ceramic art work, which has gained the attention of illustrious visitors, art connoisseurs, and the public, by its unique style and the perfect taste and refinement in which its design is treated. They brought out a new tint of color for their vases and figures, resembling ivory, but more mellow in depth of color and with a creamy softness that rivals the Satsuma as a ground color for the sober tints and finely chased gold work and bronzing of the Japanese style of decoration. The designs now in question have all the repose of Japanese coloring, combined with the more correct taste in outline of Western art in the forms of the objects. It is apparent that they have all been the subject of careful study; for, while there is no mere imitation of the Japanese, the feeling of that peculiar style has been seized, and thoroughly worked out, with great refinement and with the intelligence of an art student. Not only was every form expressly modeled for these subjects, but the peculiar tints of colors were specially produced by the Worcester color chemists, with the bronzes of various shades. Mr. R. W. Burns, F.S.A., the art director and one of the proprietors of the Worcester Works, has designed and produced all these articles; and he has been ably seconded by his chief modeler, artist, and chemist, Messrs. Hadley, Calowhill, and Bejot, to whom have been awarded medals by the jurors of the Vienna exhibition; while to Mr. Burns and the Worcester Works a diploma of honor has been awarded. We are indebted for the illustration to the *London Illustrated News*.



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