Scientific American.

NEW YORK, AUGUST 7, 1858.

Mechanics' Fairs.

Among other improvements which mark the character of the present age is the attention bestowed by men of sense and education on the highly useful and liberal policy of providing popular exhibitions, illustrating in themselves the progress, and in many cases the history of the several branches of sciences and the mechanic and more polite arts. Such exhibitions not only afford satisfaction to every lover of his country, and every friend to the welfare and prosperity of mankind, but impart to the thousands who visit them the most impressive, useful, and comprehensive lessons in the history of invention and the arts, and their application to the various branches of industry and every-day life. In viewing the miniature construction and operation of the most intricate piece of machinery, the untutored mind is enabled to grasp and comprehend its nature and operation, and appreciate its benefit, and the ingenuity and skill expended in its production, and to thus acquire a knowledge which it would be difficult to convey through the more slow, tedious, and (to many) distasteful processes, laid down in books. In order that the ingenious and useful contents of these exhibitions may be presented in the proper form and order, equally to the emolument of the learned and the less perplexing of the unskilled and more ignorant observer, we would suggest to those having them in charge, as well as to the exhibitors, the observance of one or two rules, which will tend to destroy the prejudice existing against them, and enable them to fulfil the praiseworthy objects they are designed to accomplish.

To render such a fair or exhibition effective in the particulars we have mentioned, it is necessary that it should be what its name implies, under the superintendence of pecuniarily disinterested and impartial men, whose sole object is to benefit science and the mechanic arts and their fellow men, by displaying to the world, in the most familiar and instructive manner, the manifold results of the ingenuity and skill of the inventive mechanics and others, with which our country fortunately abounds. These men should be practical, and beyond reproach in their characters, and of such occupations and stations as to properly represent the several classes and branches of business to which the exhibitors and the results of their skill and genius belong. In the selection of committees to examine, report upon, and award testimonials of superiority to meritorious inventors, skillful mechanics, and the other marked producers of articles on exhibition, a sole regard should be had to their ability and honesty to faithfully fulfil the trust reposed in them. It is too often the case that the prominent members of agricultural and mechanical fairs are not only unfitted for the responsible positions they hold, but are mainly of that class of men who assume such stations solely with a view to notoriety, and to their own emolument, or the emolument of others; or who, being deficient in the knowledge and judgment necessary to distinguish the meritorious from the unskillful, are governed by the designing, or their personal partialities. Hence it is that the annual fairs and other exhibitions held at different sections of the country, which, if properly carried out, would produce great good and rational enjoyment, are diverted from their purposes, and made to injure, rather than encourage science and the mechanic arts.

Another rule which we would commend to the attention of the superintendents and exhibitors, is that of proper taste and judgment in the method of the arrangement of the articles being exhibited, so as to properly display their character, and enable them to be fully understood. They should be comprised together in the classes to which they respectively belong, with a distinct space between each other; and where they are of such a nature as to prevent them being understood from the descriptive title or explanation marked on them, a person should be in attendance to describe them and their points of excellence. When a series of machines are on exhibition for performing the different operations necessary in the fabrication or treatment of a particular article, they should be arranged in the proper relative positions with each other, to illustrate the various successive stages through which it passes, with samples to show the effect produced at each stage, and in this manner a full knowledge could be acquired, in a short time, of all the details of the manufacture of the most useful articles and fabrics; as, for instance, the familiar articles of sugar and cotton, through the various operations necessary to change them from the crude state they appear in when in the forms of fresh cut sugar cane and cotton bale, to the respective and beautiful granulated and woven states necessary for consumption and wear.

We trust that these few and brief suggestions will be received in the same spirit of sincerity in which they are dictated, and that those really having the interest of the arts and sciences and their fellow men at heart, will at once set to work in the same spirit, to remove the evils attending the associations having these fairs in charge; and by disarming suspicion inspire that confidence and attachment with which it is indispensible to the public welfare that they should be regarded.

To make Brass and Alloys.

The fusion of metals and the mode of mixing them in the crucible to form alloys require much care, because alloys are very difficult to make, especially when the metals, of which they are composed are of such a character as have a kind of antipathy for each other—such, for instance, as copper and lead. The method to pursue in mixing them is as follows:—First, melt the least fusible of the metals (that requiring the highest temperature) of which the alloy is to be composed, and after it is fused, keep up the heat until the metal acquires such a temperature as will bear the introduction of the other metals without instantaneous and sensible cooling. After this, introduce the other metals in the order of their infusibility—the most difficult to melt first. Whatever may be the proportions of the metals, it is indispensable to melt the most refractory first, and especially when it is to be the principal base, such as copper in all brasses. The liquidity of this metal gives, indeed, the measure of the temperature necessary to complete the alloy All the metals to be added, after the most refractory is first added, should be heated in the flame of the furnace, in order to elevate their temperature, so that there should be as little difference as possible between the heat of the molten metal in the crucible, and that to be added to it. This is especially necessary when a volatile metal, like zinc, is to be added to copper, because when it is melted very suddenly, it is liable to crack the crucible. The contents of the crucible must be stirred well after the introduction and fusion of each of the component parts of the alloy. When all are added, the crucible is covered, and an increased heat given to the fire—intense according to the difficulty with which the metals enter into fusion. In alloys containing a large proportion of zinc, the surface of the metal in the crucible should be covered with a thin layer of charcoal powder. This precaution is not necessary, unless the alloy contains a metal requiring a high temperature for its fusion, as, for instance, copper or iron.

In alloys containing tin, however, a layer of charcoal placed in the crucible is liable to convert part of the metal into dross, therefore ground clean sand should be used in place of it. All alloys should be vigorously stirred when run into molds. The crucibles employed should be thoroughly cleaned after each operation. Such are the general conditions which should be followed in making alloys. Copper melts at 1920° Fah.; zinc at 700° Fah.; lead at 590° Fah.; tin at 450° Fah.; cast-iron at 2100° Fah. A dull red heat is estimated at 1489° Fah.; a bright red heat at 1830° Fah., and a white heat at 2910° Fah. In practice it is generally found that a minute quantity of old, introduced into a new alloy imparts to the composition greater homogenety. Alloys should be first cast into ingots, then re-melted to be cast into boxes, or any article for which they are required. Why this should be done is simply a matter of practical experience, it having been found that castings of bronze and brass give, at the second melting (when the proportions of the metal are correct), a cast of a superior grain and a greater soundness.

An alloy composed of zinc, tin, lead and copper, should be made by forming the three first metals into an alloy and casting them into ingots, then melting the copper, and adding this alloy to it. By this mode of making the copper alloy, a very superior casting is obtained.

In England where the manufacture of brass is carried on very extensively, the furnaces employed for smelting have movable covers of a dome shape. The crucibles employed are of Stourbridge clay, one foot deep and eight inches in diameter, each furnace holding nine crucibles. The duration of a charge is twelve hours; the fuel used is coal and coke, and 64 pounds of copper and 88 pounds of ground calamine (zinc ore) are the proportions of each charge. When a heat of twelve hours is completed, the crucibles are taken out with tongs, the brass is skimmed to remove the slag, and the molten alloy then run into ingot molds. Muntz metal, so well known, is composed of 60 parts copper and 40 parts of zinc. Muntz obtained a patent in England for the application of brass sheathing for ships, and when he died a few years since, he left a fortune of £600,000—about three millions of dollars—all made by his patent. He was an able business man, and knew how to work his patent to the best advantage, hence his great success.

A brass composed of 4.69 copper and 31 zinc is very suitable for hammering. A brass of 5.64 copper and 36 zinc is useful for brazing iron; 6.75 copper and 25 zinc; 7.51½ copper, and 27¼ zinc. In general, common brass may be calculated to contain 2 parts of copper and 1 of zinc. Dutch metal is composed of 84.5 copper and 15.5 of zinc. It is of a pale yellow color, and so malleable as to be capable of beating out into leaves, and so thin as to be employed for cheap gilding. Chinese brass is composed of 56.9 copper, 38.27 zinc, 3.30 lead, 1.08 tin, and 1.48 iron. It is very strong and durable. A little lead improves brass for turning purposes, and it is usual to put it in just before pouring out, and about three ounces of lead to ten pounds of brass is the amount used.

Fine brass wire is woven into fabrics like those of cotton yarn for sieves, bolting cloths, &c. Tin wire is made into a warp for the loom, the weft wound on a spool, and placed in a shuttle which is thrown by the weavers by hand, from side to side, in the same manner that old-fashioned hand loom cloth weaving was executed. Two men are necessary to work one loom, each throwing the shuttle alternately. Brass wire has some peculiar properties. When annealed it is very soft, easily bent, and woven in the loom, but it must be rendered elastic for common use. The elasticity or spring is imparted to it by stretching and heating in a frame; in other words, "the spring is licked into it." When kept for a considerable length of time in a state of high tension, brass wire is liable to snap suddenly. It should therefore never be employed, as it oftentimes is, for suspending chandeliers and such like objects.

Nitre Beds.—At Bahia, in the Brazils, near Sao Francisco river, 180 leagues from the city of Bahia, a great natural deposit of nitrate of soda has been discovered, extending sixty miles along the valley.

Painless Extraction of Teeth.

Various methods have been resorted to for the purpose of alleviating the excruciating agony consequent upon the extraction of teeth; but as the general anæsthetics are in all cases tedious and troublesome in their application, and often attended with fatal and dangerous results, sufferers, rather than experience the momentary pain of extraction, or run the risks of general or local anæsthesia from the means heretofore employed, impair their health by retaining in their mouths diseased teeth and roots. To avoid the dangerous results of chloroform, and to do away with the employment of the not either harmless or efficient process of freezing mixtures to the jaw, Mr. Jerome B. Francis, of Philadelphia, has invented a method of producing local anæthesia by the application of an electric current, and through this means to effect the painless extraction of teeth. The application is simple, and consists in attaching to the forceps the negative pole or flexible wire of the ordinary electro-magnetic machine, or graduated battery, and placing the metallic handle of the other or positive pole in the hand of the patient, and by this means to cause an interrupted current to traverse the body of the patient and the extracting instrument. The intensity of the current is previously graduated while the patient grasps the forceps and handle, until it is just distinctly perceptible, and the circuit through the tooth is not completed until the moment at which extraction is to begin. This interruption is said to be desirable until the forceps are placed upon the tooth, when the circuit is formed, and the extraction made at once. How this annuls pain we cannot determine, but that it has, in a large number of cases, we are satisfied from the representations of able dentists in this and other cities. This novel process of extracting teeth was patented the 25th of May, 1858, and the claim is to the combination of the electro-magnetic machine, with the dental forceps.

Blanchard's Steam Engine.

The principle that a fire can be made to give more heat, and the fuel more economically burned, by means of a mechanically forced blast than by a chimney draft, has been thoroughly demonstrated by Mr. F. B. Blanchard, of this city; and when the heat which is not used in the boiler is made to superheat the steam, and afterwards heat the feed water, a still greater economy and consequent saving of fuel is obtained.

The *John Faron*, a steamboat of 250 tuns, not built on a model adapted for high speed, has had Mr. Blanchard's improvements applied to her, and so well and economically is the fuel burned that a small six-inch stovepipe is sufficient to carry off the products of conbustion. A few days ago we had an opportunity of personally observing the value of this improvement on board this boat, during one of her ordinary passages from this city to Haverstraw, on the Hudson—a distance of forty miles. She made this distance in 3¼ hours each way, at an expense of 1,375 lbs. of fuel the forty miles—a most astonishingly small quantity of coal for a boat of her size and build. She lies at the village of Haverstraw all night, and so well is the heat cared for and fostered that without firing up during twelve hours, the steam was kept up, and only lost about ten pounds pressure from six o'clock one evening to the same hour next morning. In a few weeks we shall give engravings and a full description of this valuable invention.

Petition for Extension of Patent.

F. E. Sickles has petitioned for an extension of his patent for opening and closing valves of steam engines, which expires on the 19th of October, 1858. The petition will be heard on the 4th of October next, and all persons opposing the extension are notified to show cause, if any they have, why it should not be granted. The testimony will be closed on the 20th of September, and rules for taking the same can be had by addressing the Commissioner.