

masters of the place, I should not hesitate to say that they are as straightforward and fair as any manufacturers in the world.

In the large manufacturing jeweler's establishment of Messrs. T. & J. Bragg, which is one of the principal sights of the kind shown to the members of the Association, and where there are usually from thirty to forty apprentices in the workshops, none are accepted without signing an indenture by which they are bound to attend the School of Design, and without they are able to show some amount of skill in drawing. This is demanded as a qualification for good handiwork in all the artisans, but a special artist is constantly employed here in making new designs, and I recognized many which were familiar to me in the shop windows of Regent street and Bond street—one in particular was the design for the brooch presented to the Princess of Wales by the ladies and gentlemen of Wales, which was exhibited at the house of one of the great jewelers in London.

All jewelry of the best class has risen in price of late years, and this is due, not, of course, to the gold used, but to the increased amount of labor bestowed upon the work. It is true, at the same time, however, that good gems have immensely increased in value; an amethyst, which, in the Birmingham trade was once worth about 30s. is now worth £80. Pearls and turquoise have also increased much in value since the fashion for setting them in bosses has come into vogue. The jewelers of Birmingham often buy their own jewels, traveling all over the world for the purpose—their pearls and amethysts perhaps at Ceylon, their turquoise at Alexandria. Their cameos are purchased largely at Rome and Naples, where also they buy coral in large quantities. I do not mean to say that the Birmingham jewelers have the enterprise to do this to get possession of the finest jewels—this is not their object, but, rather, to obtain the largest quantity at the lowest price; their trade, as I understand it, is a rule, requiring jewels of moderate value. The more costly gems, however, are constantly sent to Birmingham to be set, and, I saw to-day, at Messrs. Bragg's, several very splendid brooches set with brilliants and emeralds, the value of which in their warehouse, would be from four to seven hundred pounds. But necessarily where a stock of 7,000 cravat pins is the average on hand the gems cannot be of the first water. These, however, as indeed is to be understood of all the objects made at this factory, are not imitation jewelry; the articles may vary in quality, but none are sham; that is to say, if a very pale amethyst is used for a brooch or pin, and given the look of a fine purple by placing a piece of metal foil of that color behind it in the setting, the price tells at once what it is.

It may be interesting to know how in working with these precious materials of gold and gems the manufacturer protects himself both against loss by theft and loss by waste. Of course gold in the hands of a workman is dealt with as if it were a *corpus vile*—literally "vile body"—so far as hammering, filing, chiseling, firing, and shaping it into any ornamental form a very tough metal can be got to assume. It is startling to see it lying about on the benches in unworthy looking sheets and plates, no brighter than the dullest brass; but there is a close check kept upon theft or waste. Every workman has an account kept against him in a book, and in this is set down the precise weight of gold he asks for in the work set him, and of which he is usually furnished with a drawing traced from the artist's designs or a pattern in metal. The weight of the gold is taken in shot, not in any regular weights; and on one side of the foreman's window, whose duty it is, there is a nest of drawers, each one labeled with the name of a workman. These all contain, more or less, shot of all sizes, so as to enable the weigher to take the exact weight to a part of a grain, and stand, in fact, as the debtor side of the account against the workman; when his work has progressed sufficiently he brings it to be weighed against his shot, and the balance is struck, he being allowed a proportion of 1-20th for chips or waste. This, however, would be a very serious loss to the manufacturer if he were not to collect every atom of filings and cuttings by placing below the bench at which every man works a leather apron into which the man brushes with a hare's foot all the chips and filings. These are easily freed from dust and refuse by burning, and the gold melted again for use. There

is seldom, however, any irregularity among the accounts, as the workmen are a very superior set of men, well educated, and disposed to cultivate themselves in every way, speaking frequently French and German, though English natives, and many of them taking their holiday every year with a trip to the Continent. The pay of these superior artisans, however, is not so high as might be expected—it is rarely above £3 a week, and seldom lower than £2. I have heard of glass blowers in Birmingham getting as much as £5 a week, if they choose to work every day, which they never do, for St. Monday is most religiously worshiped in Birmingham, and often another day or two in the week is canonized by these first-rate hands.

It is extremely interesting to see the very same process of enameling on metal work as those known to have been followed by the ancients, and even the identical drill is used by these jewelers that may be seen in the museums as a relic of the arts of the Egyptians. All the work of setting bosses with turquoise and pearls is done by this, the jewel being fixed in the little cell drilled for it by tapping the metal gently all round it, and so folding it in upon it. Diamonds are all set in this way in a layer of silver soldered on to the gold, and then cut away where required. Messrs. Bragg are probably the largest enamellers in jewelry in the kingdom, and their work is quite equal in quality to the best done by the French workers in enamel; and I have no doubt whatever that the artist workmen that I saw here at their work could do anything that has been accomplished with so much success by M. Rudolfs and his clever workmen in imitation and reproducing the mediæval ornaments of this kind.

Indeed, we must no longer think of Birmingham jewelry as "all laquered shams" after the excellent specimens of gold work and enamel with fine jewels to be seen here. I should be more disposed to say, from what I have seen here, that the "great houses" in the trade find it very much to their advantage to keep up the term "Brummagem shams;" it enables them to buy upon this bad reputation and sell upon the merits and good qualities of the real Birmingham article.

But it remains to say one other thing in defense of Birmingham from the old calumny of shams, and that is, that although so much imitation gold work is made, both by rolling thin film of gold upon brass, as well as by depositing it upon a yellow metal by the electro process, yet the style of ornament adopted is necessarily improved upon the shams. All the best patterns in the old Birmingham work are very closely imitated by the use of the electro process. The prettiest lockets and brooches are made wholesale at Birmingham and some halfpenny each, and sold retail at about sixpence. This is certainly cheapening the beautiful as well as the ornamental, though I am by no means prepared to say that it is a good thing to see our poorer and working classes wearing tawdry ornaments, and spending even the penny, much less the sixpence, in these "coarse vanities."—*London Daily News*.

An Immense Iron Railway Bridge.

The new iron bridge across the Connecticut River at Warehouse Point, now being erected by the New-Haven, Hartford, and Springfield Railroad Company, will, when completed, be probably the finest railroad bridge in the United States. It is built on the "truss" principle, of the best procurable material, and in the most approved style. It consists of seventeen spans, the longest being 177 feet, extending over the river, the carriage road, canal, and tow-path. The entire length of the structure is 1,525 feet.

The total weight of iron used in its construction is about 700 tons, and cost in England, where it was made, £11,231. The plans for its construction were designed by Mr. James Laurie, one of the best known civil engineers in this country, and were at first tendered to a prominent iron firm in Philadelphia, but at that time nearly all the large iron workers in the country were engaged on Government work, and it was finally determined to procure the construction of the bridge in England. The contract was awarded to the celebrated bridge builders, Wm. Fairbairn & Co., of Manchester, but afterward a portion of it was assigned to the London Engineering and Ship Build-

ing Company, some of the managers of which were the builders of the famous Britannia bridge over the Menai Straits. The bridge being built in sections and fitted together, was then taken apart, and shipped to this country.

About 175,000 rivets are employed in fastening together the various pieces. The great difficulty encountered in putting the bridge in its place arose from the fact that the new bridge is to occupy the same position as the present wooden one, and it was desirable that the traffic of the road should not be interrupted while substituting the one for the other. A good deal of planning and study were required to effect this object, but the skill and ingenuity of Mr. Laurie has hitherto overcome all obstacles, and most of the spans are now in position, without, we believe, a single interruption to any train. The erection of the bridge was commenced about the 1st of July last, and it is expected that the entire structure will be in position and completed by the last of January next.

MISCELLANEOUS SUMMARY.

THE valve of the great steam whistle at the Western Railroad shops, in Springfield, happened to be open recently, when the fireman lighted his fires at 5 o'clock, and when enough steam had been generated it began to scream. The fireman did not know how to stop it, the result was a general fire alarm; all the bells in the city were set to ringing at their loudest, and the firemen got into a white heat before they found out what was the cause of the pother.

THE ABBE LABORDE has been investigating the spectrum produced by the lightning flash, and states, as the result of his experiment, that he has seen on three or four occasions the several bright lines of which the spectrum is composed. The lines seen are all of a dull white or lead color, but one of them is always more distinct than the others, and is sometimes the only one observed. This line seems to be situated close to Fraunhofer's line E.

THE EXPLOSION OF THE "ST. JOHN" BOILER.—The examination into the causes of this disaster, by which fourteen persons were killed on the steamer *St. John*, is going forward, but nothing has been published at the time we go to press throwing any light upon it. When the evidence is printed, we shall lay it before our readers.

RYE-STRAW AND TOW PAPER.—Mr. M. A. Cushing, of Glenn's Falls, N. Y., sends us samples of paper made from three parts coarse tow, shoove and all, and one part rye straw. The paper is very white and of good quality, and devoid of that harsh, brittle feeling and texture which is common to straw papers. The company is now making two tons per day.

WATER-WHEEL CHALLENGE.—H. Van De Water, of Buffalo, N. Y., offers to put up \$500 and match his jonval turbine wheel against any other patent turbine wheel in the United States. Here is a challenge for something exciting. Mr. Van De Water wishes to put the money into our hands, which we decline to hold.

THE destruction by fire of the Coscob bridge, on the New Haven Railroad, suggests the importance of painting wooden bridges of railroads with some mineral paint that will be a protection against fire. Iron is best for such bridges, but wood is mostly used; hence the necessity for some fire-proof paint.

AN antiquarian discovery of much interest has been made in Fife, Scotland. On the wall of a cave were found sculptured the forms of elephants, birds, and fish. It is supposed that in the early ages of Christianity the cave was used as a place of worship by anchorites, and that St. Adrian dwelt in it.

THE most valuable lot of furs ever brought to St. Paul was lately received from the Hudson Bay Co.—6,000 mink skins, worth \$50,000. The skins filled twelve ordinary sized boxes, and the St. Paul Press says they are worth more than their weight in silver.

PINK, buff, mauve, and green starch is now made, and by its aid any delicate fabric may be colored as well as stiffened.

THE best locomotive engines now cost \$30,000; passenger cars, that formerly cost \$2,000, now cost \$4,000.

Improved Combination-pipe Vise.

Gas fitters, plumbers, and metal workers generally, know how difficult it is to hold a pipe in a common vise with parallel jaws. The surfaces in contact are so small that the pipe is often squeezed flat, somewhat, before it will hold at all, and is always a source of annoyance. If a thread has to be cut on a large pipe, it is almost impossible to hold it without jamming or defacing it. The same is true where a pipe has to be cut off.

In this engraving a useful modification of the common vise is shown. It is simply a set of dies, A and B, fastened to the vise jaws by pins, C, and sliding in each other. By this means the vise can be used either for pipes or other common work. The jaws are serrated, as shown, and will take a pipe three and a half inches in diameter. These vises can be swung around in any direction, being attached to a swivel bolt, as shown; they are made of different sizes.

This is an extremely useful tool, and was patented through the Scientific American Patent Agency on August 1, 1865, by H. B. Dart. For further information address N. B. Smith & Co., assignees, No. 634 Broadway, New York.

Machinery for Rice Culture Wanted.

Mrs. Jane Pringle, of Georgetown, S. C., who owns two thousand acres of rice and cotton lands, desires to call the special attention of inventors and patentees to the necessity which now exists in the rice districts of the South for certain labor-saving machines. The following extract from Mrs. Pringle's letter will explain the kind of machinery wanted:—

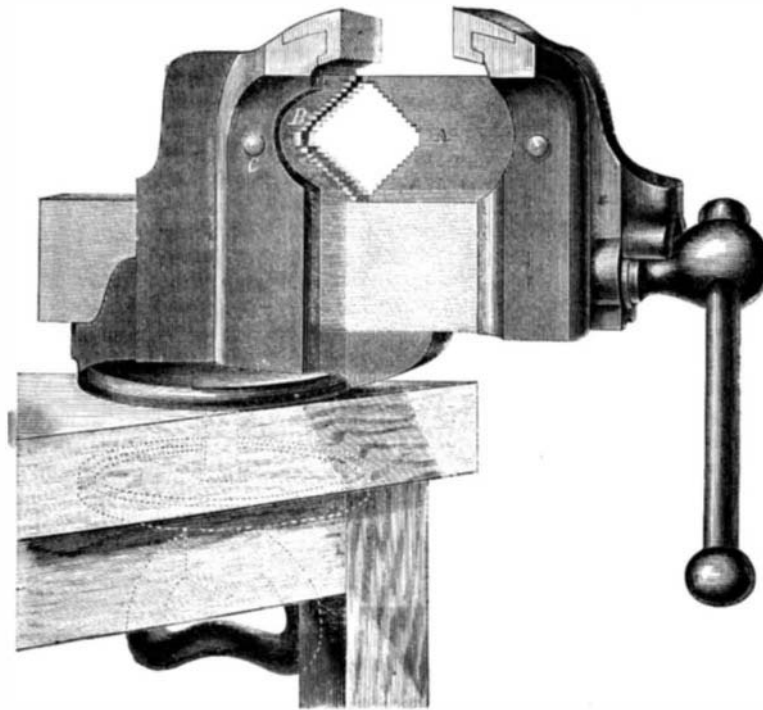
"There are three machines which will save labor and be immensely advantageous to the rice-planting interests, if successfully carried out. These are, a machine for thoroughly cleaning ditches; one for sowing rice, which shall not make the lines sowed too compact, but which shall scatter the grain a little in sowing so as to allow room to tether as it grows. A cradle or other instrument to use with, is of imperative necessity; the different kinds of rice heads are so heavy that, as the sickle strikes the stalk, it being top-heavy, falls and sheds the rice on the ground, which, besides the loss, injures the next crop in the form of volunteer rice.

"The machines referred to would be of vital importance to us as substitutes for expensive free labor of an intermittent character."

Pneumatic Dispatch.

Recently, a small goods train was driven through the company's tube from the central station in Holborn to the terminus at Euston station, passing beneath Holborn, New Oxford street, Tottenham court road, Hampstead road, and Drummond street on to the Euston station, a distance of about two miles, having some sharp curves on approaching the Northwestern station. The width and height of the tube were 4 feet 6 inches respectively, rails being fixed in it for the carriage wheels to run upon. At the central station in Holborn two tubes were carried beneath the footway and ground floor of the building; one connecting Euston station with the central station, and the other being intended to connect the latter with the post-office in St. Martin's le Grand. This tube has only been carried to Holbornhill. In the Holborn station the back portion of the building was occupied by three boilers, each of which could be worked up to a pressure of 30 pounds per square inch. As a rule only one boiler will be worked at a time, though all three could be used if necessary. Between the boiler room and the arrival and departure platform is the engine room, fitted with two 24-horse power engines, which work the shaft of the circular disk or fan, 22 feet in diameter. This revolving rapidly upon its axis, having inclosed air chambers, could be used either for propelling the laden trains forward by atmospheric pressure behind them, or for drawing them back through

the tube by forming a partial vacuum before them. The trucks of goods, accompanied by one of the attendants, were blown through the tube to Euston in about five minutes, showing the ease with which a portion of the goods and parcels traffic of the metropolis would shortly be conducted. Wheatstone's telegraphic apparatus was used at the stations, and was found to act well. The entrances to the tubes in the stations were opened or closed as required. In the stations there were two main lines of rails being, 3 feet 8½ inches. There were also two traversing platforms for

**DART'S COMBINATION-PIPE VISE.**

shifting the trucks from one part of the station to another. The Duke of Buckingham, the chairman, and some of the directors of the company, were blown from the Holborn station, under the supervision of Mr. Rammell, the engineer, through the tube to Euston, which distance was accomplished in the short space of five minutes. The tube between Holborn and Euston station is now complete, and ready for opening.—*London Times.*

LOSIE'S THIMBLE.

This engraving represents a new invention intended to be used where stove pipes pass from one room to another or into the walls of rooms. As it sometimes happens that stoves of different sizes are put



in the same room, according with the tastes or convenience of parties occupying the premises, the hole for the pipe, if not made so that it can be varied at will, must be enlarged or reduced. This is a work of much time and trouble, and is wholly obviated by the use of this device. It is merely a casting, A, with a series of rings, B, fitting each other as the cover of a stove does. Each aperture, covered by these rings, fits a pipe of a certain size, so that by merely removing one ring, or adding one, as the case may be, the pipe hole can be graduated at will. When the stove is taken down in summer the hole is closed

by a register valve, C, which serves to ventilate the room. The dotted lines, D, indicate cleats which hold each ring in place, so that they cannot fall out. The article is very cheap, and the inventor will supply castings to dealers, or sell exclusive rights. Circulars sent to any address on receipt of stamp. For further particulars address T. M. Losie, Elmira, N. Y., by whom it was patented through the Scientific American Patent Agency on Feb. 14, 1865.

LOCK UP THE THROTTLE VALVE

We notice occasionally, in looking over our exchange lists, casualties arising from persons getting on locomotives and running away with them. Here is a case in point:—

"A curious incident occurred recently at Kane Station, on the Philadelphia and Erie Railroad, as related in the *Williamsport Bulletin*. A locomotive was standing on the track while the engineer was at breakfast. An Irishman, to gratify curiosity, stepped on and opened the valve, letting on a full head of steam. For a moment the rush of steam drove the wheels around so rapidly that the engine stood still, and the Irishman jumped off. Then, with a bound, away it went down the road at the rate of seventy or eighty miles an hour, for about three miles, when it ran into two cars loaded with lumber, scattering them like chaff, at the same time smashing itself into a useless heap. No one was killed, but it was our opinion that the Irishman ought to have taken the ride and the chances of the engine, smash and all."

This accident cost the company thousands of dollars. If a passenger train had been in the line, instead of two empty cars, no amount of money could have paid for the loss of life. "An ounce of preventive is better than a pound of cure;" the throttle valve should be locked up by some simple device, so that the engineer could put the key in his pocket. The arrangement should be secure, and such that the lever could not be budged unless released. This lock would be an insurance against mischief in any design, and be adopted by railroads generally.

A Feat in Boiler Making at Hartlepool.

The screw steamer *Wearmouth* is being fitted up with new boilers, just now—"under high pressure," at least as to the speed with which they have been constructed. The result has been one of the most expeditious pieces of boiler making we have heard of in the district. Within 16 days from the boiler plates being put into the hands of a batch of efficient workmen, under the superintendence of Mr. George Duncan, an experienced Clydesdale manager, at the Hartlepool Ironworks, the boiler was completed, tested with 48 lbs. to the square inch water pressure, and again with 25 lbs. steam, ditto, and declared perfect. Persons who know anything of boiler making, or who have observed the labor incident to building a boiler 13 feet 4 inches, by 13 feet 6 inches by 10 feet 6 inches, adapted to a marine steam engine, to be heated with four furnaces, will know that this is indeed a feat of rapid execution; and it is creditable alike to foreman and workmen to say that the work has been done by time, and not by "piece."—*Stockton and Hartlepool Mercury.*

"No-ink Pen."

We exposed this petty swindle on page 216 of our present volume. The swindler at that time operated in the name of Morton. We are beginning to hear of him again; he has now assumed the name of Blake, and seems to be again plying his trade with renewed vigor. We wish to state distinctly that we never recommended a "No-ink Pen" in our paper, and that the whole thing is a cheat. We hope the rascal may be apprehended.

THERE were 23,000 persons weighed on the scales at the Boston Mechanics' Fair. The average weight of men was 141½ pounds; average weight of women was 124½ pounds. The largest man weighed 293 pounds. The largest woman weighed 274½ pounds.