Tucker Bronze.

A New Haven correspondent sends us the following very complete answer to a recent inquiry: Tucker bronze is the result of the compound oxidation by heat of cast iron and linseed oil. The cast iron is cleaned, polished if desired, coated thinly with linseed oil or varnish containing linseed oil, and subjected to a heat sufficient to oxidize the iron, say 420°, for a light yellowish color, and higher for darker tints. The color, which is modified by the oil, may be of any desired shade which can be derived from the action of heat on iron. By carrying the heat to 600° and repeating the operation, a quality of black japan is obtained which can be hammered without injuring its polish. Carriage buttons are made in this way.

The finish is very durable and, on work partly polished, beautiful.

It is the common way of finishing all kinds of cast iron house furnishing goods. Tucker, the inventor, obtained a patent in 1863, which has been the subject of much litigation. He committed suicide some time ago by breathing illuminating gas through a rubber tube, attached to a gas burner.

IMPROVED FIRE ESCAPE.

The engraving shows a flexible ladder fire escape, designed mainly for use from the window sills of buildings, which was recently patented by Mr. William Jensen, of Victoria, British Columbia, Canada. A flexible steel wire rope ladder of any required length is made up of three longitudinal strands—the outer ones of which diverge from each other in a downward direction—that are connected by cross strands to form steps. At every eight feet is placed a rigid step, consisting of a steel bar, in order to keep the ladder well spread. This construction combines lightness with strength and makes a fireproof ladder which, when extended from the window sill to the ground, has all the necessary stability without the aid of side braces, the lower, spreading end forming a wide base. By means of long steel pins driven in between the paving stones the lower end of the ladder is fastened to the ground; the inclination of the ladder not only facilitating the ascent of firemen, but also protecting persons ascending or descending from being burned by any flames issuing from the windows of the lower stories of the building. The entire fire escape is galvanized in order to protect it from dampness, and each longitudinal strand is guaranteed to sustain a load of 3,500 pounds.

The opposite end of the ladder is fastened to the barrel of a portable windlass (shown very clearly in the small cut) of a suitable size to sit upon the window sill. The barrel is mounted in a frame consisting of side standards united by stay rods and stiffened by front braces. The frame is formed into long legs which, when the windlass is placed on the sill, enter corresponding cast iron sockets inserted in the sill, thereby firmly holding the windlass in place. The sockets have stoppers to prevent dirt from collecting in them when the fire escape is not in use. The barrel is operated by a handle on one or both ends, and on removing the lower pins the ladder may be easily wound up and the whole apparatus packed away in a box ready for immediate use in case of danger. The box is kept inside the room, and may be of an ornamental or useful character, and may be carried from window to window as required. The weight of windlass and ladder for a five-story building is only from 80 to 85 pounds, the length being about 60 feet. In a trial in San Francisco, the ladder was placed in an upper window of the Appraiser's building, lowered, and the spikes driven in the ground in the space of one minute, ready for people to ascend.

This invention has also been patented in England, where it is meeting with much success. Further information may be obtained by addressing the patentee.

Opening of a New Electric Street Railroad.

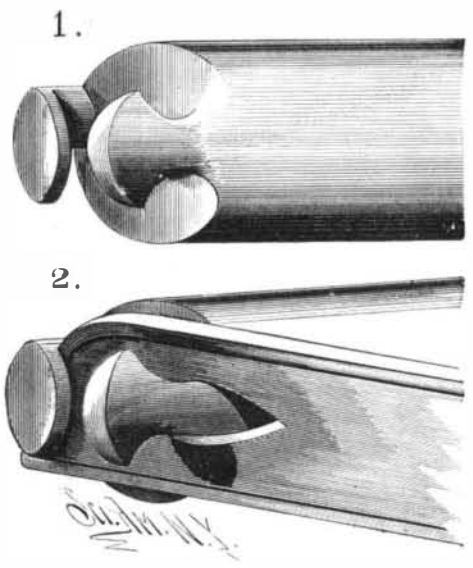
The first electric railroad for public use in America went into operation in Cleveland, O., July 26, in connection with the East Cleveland Street Railroad Company, who have just completed a mile road. The experiment was so successful that the company expect to change their entire system, comprising over twenty miles, into electric roads. The system used was a combination of the Brush and Knight & Bentley systems, and the current was carried on underground conductors, laid in conduits like those of cable roads. The cars were started and stopped and reversed with the greatest ease. Any number of cars up to fifteen can be run at one time on a single circuit and from one machine.

Wide Reach of a Tidal Wave.

A correspondent in the Fiji Islands writes us that a notable tidal wave reached there on October 6 last, the date of the great tidal wave, 25 feet high, and the eruption of Mount St. Augustin, in Alaska. The tidal wave in Alaska occurred at 8:25 A.M., and that at the Fiji Islands, about 4,500 miles to the southwest, at 11:45 A.M. At the latter place there were three successive waves, with intervals of ten minutes, which, at the ordinary period of low water, reached nearly to the high water mark. The occurrence of this disturbance of the sea a few hours later on the same day as the eruption of Mount St. Augustin, and the formation of a new island in its vicinity, suggests that the tidal wave at both places proceeded from the same cause.

TRACE FASTENER.

The ferrule fitting on the end of the single tree is provided on its end with two prongs, the forward one of which is formed with a recess in its top and bottom edges, thereby making a vertical end flange, and the rear prong has a flange parallel with the end of the ferrule and projecting downward and toward the front. In the end of the trace is a longitudinal eye tapered toward the ends, as is also the end of the forward prong. The trace can be easily placed on



LINDSAY'S TRACE FASTENER.

or detached from the ferrule, and since no spring or movable parts are used, the device cannot get out of order.

This invention has been patented by Mr. Ralph E. Lindsay, of Neillsville, Wis.

How Tin Plates are Manufactured.

The following is the process at the Dyffryn Tin Plate Works, Morriston, near Swansea, Wales:

In the first place we have what is termed bar iron, several feet long, about 7 inches wide, and from one-half to five-eighths of an inch in thickness, rolled according to the plates required at so many pounds per foot. It is cut in what may be termed a jack-in-the-box or steam shear, say about nineteen pounds, to a piece which will eventually be rolled into sixteen sheets of 20 inches long by 14 inches wide, 112 of such sheets forming a box, and weighing when tinned nearly one cwt.

This piece of iron is first placed in a reverberatory furnace, heated to redness, put through the chilled rolls, and rolled in what is termed thicks five times; reheated, and rolled in singles twice; doubled, reheated, and rolled three times, doubled, reheated, and rolled twice; doubled, reheated, and rolled in eighths twice, until they are stretched out to the required length and thickness. The length of the bar exceeds by about one inch the width of the sheet to be made, so as to allow for the shearing process, and the bar is therefore rolled with its axis parallel to that of the rolls. Great attention is necessary in the construction and management of the mill furnaces, so that the heating of the bar and sheet for rolling may be effected with the utmost regularity, and without the formation of scale on the surface of the bars or sheets; for when scaling takes place from the draught in the furnace being too keen or the heat raised too high, the quality of the iron is injured; the scale, if subsequently rolled into the iron, leaves a rough surface on the plates in the after process of separating and pickling. The plates are then sheared, and the rough edges taken off. The iron of nineteen pounds or thereabouts makes sixteen sheets, which, being cut in halves, leaves eight sheets in a piece closely wedged. Girls with small iron hatchets open or separate them. They are then termed black plate. From one ton of bar iron about 16¾ cwt. of black plate is made; the loss is termed shearings, and is worked up again in the forge fineries. The plates are next sent to be pickled, *i. e.*, immersed in heated dilute sulphuric acid, known as oil of vitriol.

The plates are placed in a cradle or receptacle, lifted by a hydraulic, then dropped down into a round wooden or lead tank containing the acid; the cradle is then made to revolve by means of steam power, to enable the liquid to rush between the sheets, which revolution is retained. They are lifted again by the hydraulic, dropped into a tub, a little apart from the last, containing water only, the cradle revolving as in last tub, so that the water may rush between the sheets to cleanse or wash away all trace of the acid; when taken up again, the plates are clean and bright as silver.

The plates are next subjected to a bright red heat, which lasts from twelve to twenty-four hours, in closed iron annealing pots in a reverberatory furnace; they are well covered on the top to prevent the plates from being burnt, the heat is kept as high as it can be without softening them to such a degree as to the cause them to stick so fast together as to prevent their separation when cold.

They next pass singly through cold rolls, three, four, or more times, as may be deemed requisite. These rolls are highly polished, and must be set in accurate order to give the plates a perfectly flat set and well polished surface. Again they are annealed or softened at a lower temperature than the first, as their surfaces would be damaged by being in any degree stuck together. Pickled again as before, excepting that the liquid is considerably weaker than previously, placed in cast iron troughs containing clean water renewed by a stream constantly flowing through—they are then taken in hand singly, and scoured if necessary with sand and hempen pads before being delivered to the tinman.

Now comes the last process. The sheets are iron only so far. They next reach the tin house, and are placed in a trough containing clean water, ready for the tinman, as he is termed, who then picks them up and puts them singly in a grease pan containing palm oil, to soak, and after being there for a short time, the tinman places the sheets in a large iron pot containing molten tin, with a covering of palm oil. Here it unites with the tin, to which it has a strong affinity; when he has performed his part the plates are handed over to the next man, called a washman, whose pot contains pure molten tin; after they have soaked in his pot a little, he raises them with a tongs on to the hob as he requires them, brushes the surfaces of both sides of each sheet, and after dipping them into another pot containing molten tin again, they are sent through rolls which work in a large pot containing palm oil, and the speed at which the rolls move regulates the quantity of tin to be put on each sheet. They are afterward raised from the rolls (under which they have been passing) by a youth called a riser, handed to two young women who rub them in bins or boxes containing bran, one after the other, which takes off the grease; another girl, called a duster, gives them a further polish with a skin duster, and takes them to the assorting room, where every plate passes inspection, and if not up to the mark is sent back for rectification. After passing through that ordeal, they are counted and weighed and made up into boxes.

JENSEN'S IMPROVED FIRE ESCAPE.

Bleaching Sponges.

As well known, chlorine and its compounds are unfitted for bleaching sponges, since they give the latter a yellow color, harden them, and cause them to lose their fineness. What is usually employed is an aqueous solution of sulphurous acid. This treatment takes seven or eight days, and requires considerable manipulation. Some recent researches made in Germany seem to indicate that the bleaching of sponges may be more easily and quickly effected by means of a solution of bromine in water. One part of bromine requires thirty parts of water to dissolve it. It will be only necessary, then, in order to have a concentrated solution of bromine, to pour a few drops of liquid bromine into a bottle of distilled water, and then shake it up. The sponges are immersed in this solution, and, after a few hours, their brown color will disappear and give place to a much lighter tint. Upon treating the sponges a second time in the same way they will acquire the desired shade. They are still further improved by afterward dipping them into dilute sulphuric acid and then washing them in several waters.—*Annales Industrielles.*

Machines for Rolling and Curing Tea.

A correspondent writes us that five different machines have been invented and are in use in India for this purpose, there being more than a thousand such machines employed there.