

Improved Surveying Instruments.

Mr. T. A. Matsdaira, C.E., a native of Japan, now of this city, is the author of several improvements as above. One of his instruments consists of a steel plate, upon which a bar graduated to fine divisions upon a scale of ten is fastened. At one end, so arranged as to slide upon this bar to any position, is a semicircular plate, with its circumference divided into degrees, minutes, and seconds. At the other end is a similar plate, a quadrant in form. At the center of these a movable bar is arranged to turn like a pointer and indicate the angle. Each is graduated to the same scale as the first bar. To find the required element of a triangle, it is only necessary to revolve the bar on the semicircular plate if the angle is obtuse, and upon the quadrant if it is acute, until the proper angle is indicated. With the other bar the given side is placed so that a triangle similar to the one to be solved is shown, and then the required angle can be read off from the plate. This is applicable whether one side and the adjacent angles, or one angle and the adjacent sides, or one angle and the opposite sides of a triangle are given. The result is obtained at a glance and in a few seconds, while the use of common trigonometrical calculations by sines and cosines involves the use of tables and takes much time. If the instrument is made with the accuracy attainable now in the construction of scientific apparatus, the result, the inventor claims, will be correct.

DISTANCE FINDER.

The same inventor makes an instrument for finding distances, which consists of a finely graduated brass or steel plate, two feet in length. It has a slot in the center and a movable support, to which a telescope is attached, which may be firmly fixed by a thumb screw. If, for instance, the distance of an object across a lake is sought, the instrument, which has five spirit levels to secure perfect accuracy, is placed in position, and the telescope is sighted upon the object and firmly attached to the support. It is then moved in the slot two feet to the other end of the plate, and another object is now noted through it. With this object in mind, the telescope is moved back to its first position, and turned until this second object is seen through it. The variation from the line of its first direction gives an angle of a triangle, at the other two angles of which are the two objects. By means of the first mentioned instrument the second angle and sides of the triangle are measured, and hence the distance of the first object is secured.

Another device for finding the distance of an object in a different way is also described by Mr. Matsdaira. The plate, two feet in length, has a fixed telescope at one end. At the other end, upon the arc of a circle, whose sections are four feet, another telescope moves, and has a pointer, which directs to a graduated scale at a tangent to the arc. When the two telescopes are both directed to the distant object the pointer indicates a certain number on the scale, which is divided down to $\frac{1}{3}$ of an inch. A table accurately prepared shows to what distance these numbers refer, and by looking on it the distance is ascertained.

IMPROVEMENT IN BOILERS.

The accompanying engraving represents an improved boiler recently patented by Messrs. J. D. Ogle and R. A. Burnett, of Washington Court House, Fayette county, O. The boiler is constructed with a view to a perfect and natural circulation of water, and is arranged so that all of the tubes, together with the tube sheets, may be easily removed from the boiler shell for cleaning or repairs. The flues or tubes are arranged vertically in a rectangular flue box, provided with a rectangular flange, which is bolted to a corresponding collar surrounding an opening in the rear wall of the fire box. The rear end of the flue box is riveted to the back head of the boiler, and the latter is secured to an internal flange in the boiler shell by bolts. The joints at the ends of the flue box are very strong, and capable of withstanding any strain that can be brought to bear upon them. The flame, smoke, and products of combustion pass through the flue box and around the flues, effecting a rapid generation of steam. The circulation of the water and steam in the vertical tubes is natural and perfect.

When occasion requires the removal of the tubes for cleaning or any other purpose, the bolts are removed from the rear head of the boiler and from the rectangular flange surrounding the forward end of the flue box, when the flue box, with the entire series of tubes, may be withdrawn from the boiler shell. In cases of boilers carrying a very high pressure, the flue box may be strengthened by stay bolts in the usual way. The advantages of this style of boiler will be apparent to any one familiar with the subject of steam generation.

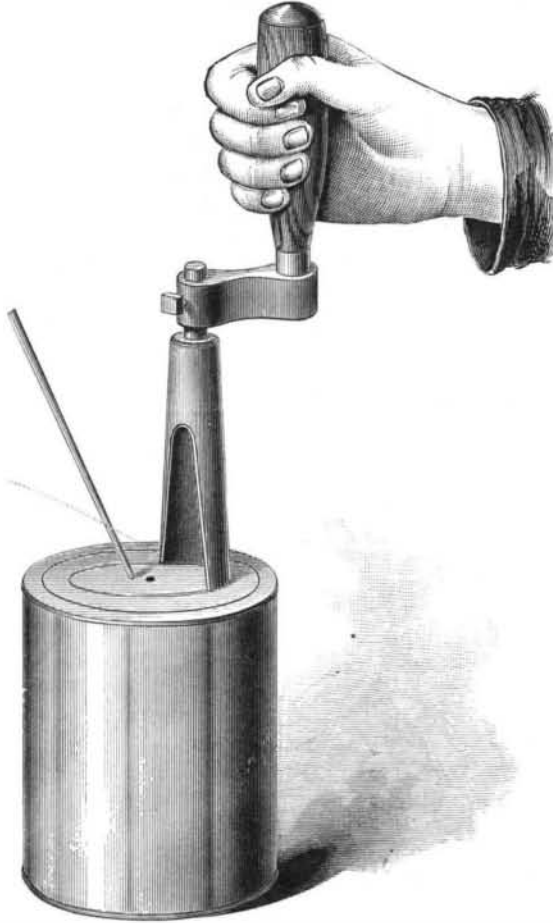
Tobacco Chewers not Wanted.

It is a well known fact that tobacco juice contains nicotine acid, a sort of tannate, very refractory in dyeing. The *Textile Colorist* says: It has just been discovered in Europe that stains and imperfections, unaccounted for so far, on various goods submitted to careful dyeing, were caused by the salivation of chewing workmen, especially weavers. Any moisture containing tobacco extract falling upon tissues of mixed materials, such as wool and cotton, notably in raised goods, as velvet, plush, blankets, etc., will create spots

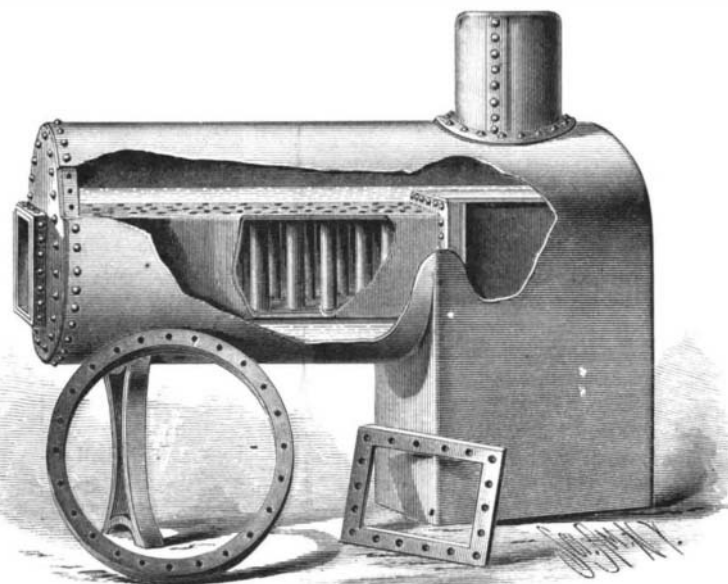
deeper in shade than the ground color, as if acted on by a stronger mordant. Manufacturers have been obliged to apply on an extra tannin mordant and redye many pieces of goods on account of this defect. Strict regulations against this ill use of tobacco salivation have been enacted in several establishments as a remedy for this curious inconvenience.

NEW SOLDERING TOOL.

The annexed engraving represents a modification of the ordinary soldering iron, intended to be used in capping or

**PAINTER'S SOLDERING TOOL.**

sealing provision cans. It facilitates the operation of soldering, and dispenses with the use of revolving tables and the complicated mechanism usually employed for the purpose. The invention consists in a can soldering tool, having a soldering edge curved to conform to the groove in the can cover designed to receive the solder, and a handle located at one side of the axis of the tool, so that while the rotation of the tool is dependent upon a rotary motion of the handle about the vertical axis of the can, its working edge is guided by the groove in the top of the can, to which it

**OGLE AND BURNETT'S IMPROVED BOILER.**

conforms. This invention was recently patented by Mr. William Painter, of Baltimore, Md.

Malleable Bronze.

Dronier claims to have discovered a simple method of rendering bronze as malleable as copper, iron, etc. This consists in the addition of a very little mercury— $\frac{1}{2}$ to 2 per cent. It seems to act mechanically rather than chemically. The mercury may be combined with one of the metals of which bronze is made, before they are combined, by pouring it into the melted metal and stirring well, or it may be put into the melted copper along with tin, or just after the latter has been added, or an amalgam of tin is stirred into the melted copper.

MECHANICAL INVENTIONS.

Mr. James J. Dubois, of Springtown, N. Y., has patented an improvement in wagon running gear, the object of which is to furnish wagon reaches constructed so that they may be screwed into the rear axle and the head block, and may be guarded from being worn by the forward wheels in cramping the wagon.

An improved ore feeder for stamp mills has been patented by Mr. Isaac B. Hammond, of Deadwood, Dakota Territory. The object of this invention is to furnish an improved machine, so constructed as to feed the ore to the mortars as it is required, automatically. It may be adjusted to feed more or less ore, as required.

Mr. Wade P. Wood, of Leon, Iowa, has patented a novel automatic brake for wagons. This invention is an improvement on the brake for which letters patent No. 206,063 were granted to the same inventor July 16, 1878. The improvements render it more satisfactory in use and more reliable in operation.

Mr. William Huey, of Cambridge, Md., has patented a machine for cutting blanks from a block of wood and simultaneously grooving it preparatory to bending it into form for making the rectangular sides of a box. The invention consists in the arrangement of a stationary horizontal knife bolted strongly to a bed frame, so that it cannot bend when under strain; an adjustable gauge plate with groove cutters arranged just in front of the knife and enough below its edge to give the proper thickness of blank, together with a reciprocating block carrier.

Mr. James A. Knetzer, Sr., of Fillmore, Ind., has patented an improvement in the class of wagon brakes in which the sliding brake bar is adjusted by a rock shaft hung on the rear axle, and having on its inner end an arm from which a rod extends forward to the brake bar. The improvement pertains to the construction of the lever which operates the rock shaft, and the construction and arrangement of the device which connects them.

A firm and easily applied device for fastening handles to axes and other tools, has been patented by Mr. Andy E. Tangen, of Bismarck, Dakota Ter. It consists in fastening the handle in the eye of the ax or tool by means of spring straps adapted to clasp the ends of the handle inserted in the eye, and a bolt inserted into the eye from the end opposite the handle, so as to engage the spring straps.

Mr. John Houck, of Tobyhanna Mills, Pa., has patented improvements in feeding mechanism for tubular cutter-heads used for turning broom handles, curtain rollers, umbrella handles, and other wooden articles of cylindrical form. Such machines have heretofore been fitted with feed rollers fixed at the front and back of the hollow mandrel to carry the sticks through, and in case of the sticks breaking, or when for any reason access was required to the mandrel, considerable time and labor were involved, as the rollers or the mandrel had to be removed from their bearings. The object of this invention is to fit the feed rollers so that access may be had to the cutter readily without disconnection of the parts.

A combined rule, square, and gauge for carpenter's use in framing, has been patented by Mr. Mahlon B. Cornell, of Philadelphia, Pa. The object of the invention is to furnish an implement adapted for carrying out all the purposes for which the ordinary square is used with greater facility, convenience, and accuracy.

Mr. Lucius S. Edleblute, of Cincinnati, O., has patented an improvement in the class of metal wheel hubs in which the spoke tenons or butts are clamped between flanged collars, one of which is adjustable on the axle box to adapt it for convenient adjustment or removal. By the peculiar construction and arrangement of parts the inventor forms a very firm, strong, and durable hub, whose parts may be readily put together or taken apart, and which is adapted to carry a comparatively large supply of lubricant.

An improved vehicle axle, patented by Mr. James Conniff, of Oconto, Wis., consists of an axle made of cast iron in a cylindrical form, and divided off at each end into compartments, in which are placed rollers in a circle, so as to form a bearing for the spindles which are inserted in the ends of the axle. The spindles are held in the axle by collars, which rest in one of the compartments between balls, which hold them steadily and prevent endwise motion without producing much friction.

Mr. Jacob Mollet, of Liberty, Mo., has patented an improved vise for holding saws while being filed, which is simple, convenient, and so

constructed that the whole of one side of a saw can be filed without moving the saw. It may be used for holding hand saws, crosscut saws, and circular saws with equal facility.

Coffee in Typhoid Fever.

Dr. Guillaume, of the French Navy, reports that, in the early stages of the disease, coffee is almost a specific against typhoid fever. He gives to adults two or three tablespoonfuls of strong black coffee every two hours, alternating with one or two teaspoonfuls of claret or Burgundy wine. The beneficial effect is immediate. A little lemonade or citrate of magnesia should be given daily, and after a while quinine.