Science and Art.

The Art of Dyeing.—No. 28.

BROWN ON COTTON—CATECHU—This substance is very generally employed for dyeing browns on cotton. The best quality of it contains about 36 per cent. of coloring matter. It is of a darkish brown color, and resembles a hard gum. It is very soluble in water, in fact, good catechu is all soluble in cold water, and gives a clear solution. This is one reason why it is so convenient for tanning purposes. When it is dissolved in water, the solution has a gummy character, and yarn put into it, if dried without washing, is rendered sticky by the threads adhering to one another. This viscous quality of catechu is overcome by metallic salts, and the kind most suitable for this purpose are those which yield their oxygen most easily. This is the reason why the salts of copper are most generally used in dyeing catechu colors. Still there are some things connected with the dyeing of catechu colors which are not yet properly understood; for, if the sulphate of zinc be added to one solution of catechu, and the sulphate of copper to another, and separate pieces of cloth run through them, and then through lime water, and afterwards exposed to the air, that which had been treated with zinc will become dark brown, but that treated with copper will not, although the copper yields its oxygen more readily than the zinc. When catechu is oxydized, there is formed an acid nearly like gallic acid, which is of a deep brown color. This is formed when a catechu solution is treated with an alkali; but cotton run first through a catechu solution, and then through another of acetate of lead, gives a deep brown color without an alkali. Cotton goods impregnated with catechu and then passed through a solution of the bichromate of potash, acquires a deep brown color; the catechu is oxydized at the expense of the chromic acid. These reactions of catechu show how very flexible it is, or rather adaptable for the production of an unlimited number of shades of brown, from the darkest to the very lightest, descending through the whole series of drabs, fawns, &c.

To dye ten pounds of cotton goods a light brown color, dissolve 1½ lbs. of good catechu in hot water, also 1½ ounces of the sulphate of copper (blue vitriol.) and place these in a tub of hot water. Handle the goods in this for ten minutes, then lift them, and enter into another tub of hot water, in which there has been dissolved two ounces of the bichromate of potash. Handle in this for ten minutes, then lift them, wash, and dry.

For a darker shade use two pounds of catechu, half an ounce more of blue vitriol, and three ounces of chrome.

Some shades require four pounds of catechu, with blue vitriol and chrome in proportion, and these given in two or three dips.—The darkest shades of catechu are dyed by preparing the goods, steeping them in a solution of sumac—two pounds to the ten—for twelve hours, then running them through lime water in one tub, and afterwards a copperas solution (one pound to the ten) in another, and then giving them the catechu, blue vitriol, and chrome, as has been described.

Common catechu browns incline more to the reddish than the yellow shade. Cotton dyed first a yellow color, with quercitron bark and the chloride of tin, if afterwards dyed a light catechu brown, as has been described, using sulphate of iron instead of copper, acquire a rich brown color, more inclining to the olive shade.

Lighting Mines by Gas.

The numerous fatal accidents in mines have given rise to many contrivances for preventing such evils. One of the most ingenious suggestions is from Mr. Septimus Piesse, who proposes to illuminate the mines by means of coal gas. The gas is to be made "on the bank," that is, on the surface, and carried down the shaft and along the "rolley ways," by fixed piping in the usual way, there to be kept constantly burning in properly constructed lamps, with an immovable gauze of wire round the flame. For supplying the lamp "in the galleries," where the actual workings are being carried on, the gas is to be conveyed by flexible tubing; by this means there will be no difficulty in moving the light to the position needed by the miner. Each lamp is to have a cone of fine Davy gauze wire round the flame, and to be protected by an outer casing of coarse gauze, which will prevent the transmission of flame to any outward explosive mixture in the pit.—[London Mining Jour.

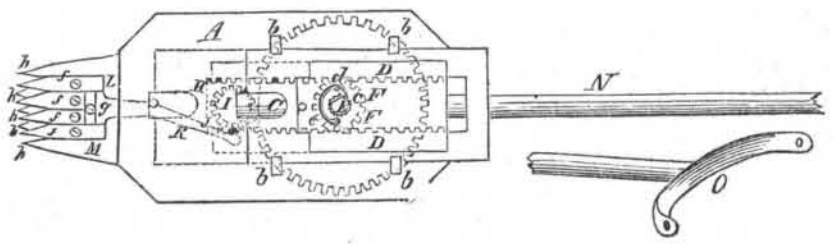
A Musquito Fan.

Joel Webster, of Brooklyn, L. I., informs us that he has in operation an apparatus that keeps eight fans in operation for eight hours; that it is simple, and can be constructed for a few dollars.

How Many Trees make a Ship.

It requires 2200 full grown trees, or the matured crop of forty-four acres of woodland to furnish timber for a single 74 gun ship.

MACHINE FOR SHEARING SHEEP.



The accompanying figure is a top view of a machine for shearing sheep, for which a patent was granted to Palmer Lancaster, of Burr Oak, Michigan, on the 24th of April last.

A A represent a top and bottom metallic plates secured a short distance apart by bolts or rods (the bottom plate is hid.) These plates may be of rectangular or other proper form. On the upper surface of the upper plate, A, there is a sliding frame, which works between suitable guides, *b*. The sliding frame is provided with an upright handle, C. At each side of this frame there is attached racks. D D, one being somewhat higher or projecting further up from the frame than the other. E represents a vertical shaft which works between the two plates, A; the upper end of this shaft extends a short distance above the upper plate, and has two pinions, F F, placed loosely upon it, one pinion being directly over the other. There are also on the shaft, E, two ratchets, *c c*, permanently attached to the shaft, the one being above the pinion, F, and the other below the other pinion, F. To each of the pinions, F, there is secured a pawl, *d*, the ends of which are kept against the teeth of the ratchets by springs. The upper rack, D, gears into the upper pinion, F, and the rack, D, on the opposite side of the frame gears into the lower pinion, F. On the shaft, E, and between the two plates, A, there is attached a spur wheel, which gears into a pinion, H, having a crank pulley, I, above it on the same axis. To the crank pulley there is attached a connecting rod, J, the outer end of which is secured to an arm, R, of a series of cutters, *f*, which work on a pivot, *g*, the cutters being of saw teeth form, and attached to a common plate, L, through which the pivot, *g*, passes. The cutters, *f*, are directly over a series of stationary cutters, *h*, which are formed at the end of a plate, M, attached to the front end of the lower plate, A. The cutters, *h*, are of the same form as the cutters, *f*, but are inclined a little upward. The cutters, *f*, are very slightly inclined. To the back end of the lower plate, A, there is attached a handle, N, having a bow, O, at its end. The bow, O, is placed under the shoulder of the operator, and may, if necessary, be secured thereto by straps. The implement is placed upon the body of the sheep, and the handle, C, is grasped by the right hand and moved back and forth, and a continuous rotary motion is given the spur wheel, in consequence of the pinions, F F, only being connected to the shaft, E, when turned in one direction, viz., from left to right. This is effected by the pawls, *d d*. As the spur wheel gears into the pinion, H, a vibratory motion is given the cutters, *f*, by means of the connecting rod, K, and the cutters, *f*, work over the cutters, *h*, similar to the blades of shears, and will cut the wool from the animal in a perfect and expeditious manner, the implement, of course, as it cuts, being moved over the body of the animal.

The advantage of this invention, besides the rapidity with which it operates, is, that the implement will not mince or cut the wool twice, nor cut the animal, as is often done with the ordinary sheep shears.

More information may be obtained by letter addressed to Mr. Lancaster.

To Furnace Makers.

A correspondent of the Providence (R. I.) *Journal*, states, that it has cost him more for coal when using heating furnaces than old fashioned andirons and grates. He states that it costs him about twice as much to heat his house by furnaces as by grates. He also asserts that a gentleman in this city, (N. Y.,) told him that one public school last winter consumed 110 tuns of coal, which used to be comfortably heated with 16 cords of wood. He concludes as follows:

"From all I can learn, I rather think that these figures present a tolerably fair view of the comparative expense of warming a building by the old modes and by furnaces.

It becomes us, then, to determine which mode of warming our houses we shall adopt. It also becomes the makers of furnaces to bring to their business a greater amount of skill, or we shall all be obliged to return to the old fashioned fire place and grate. If any of your readers will take the trouble to examine his coal bill for last winter, and compare it with the cost of warming by the old methods, I think that he will come to the same conclusion as myself."

If these statements are facts, it is high time that heating furnaces were abandoned for old fashioned grates. We however, cannot accept them without corroborative testimony.

Improvement in Furnaces.

The *Missouri Republican* (St. Louis) states that Dr. B. H. Washburn, of that city, has invented a method of feeding air to boilers on the tornado principle. It thus describes it:—

"Two connecting cones or funnels are inserted in the doors of the furnace, which insures a steady draft, and give the air the form of the whirlwind. The ash pit is inclined at a good angle, reaching the bottom of the boiler from the door in the space of a few feet, and thus every particle of heat is saved and applied to the proper surface with the greatest intensity.

But as all inventions or improvements are very correctly looked upon as possessing little merit without practical tests to recommend them, we will state for the satisfaction of the public, that this application has proved eminently successful, both with wood and coal, the trial having been thoroughly made at the Eagle Foundry. We have also had the funnels and inclined plane added to the steam apparatus of this office, and after a careful measurement of coal, find the saving to be at least twenty per cent. For further particulars we refer to the foundry mentioned."

Dr. Washburn resides at Hannibal, Mo, and has a patent on the connecting funnels; he has also taken measures to obtain a patent on his inclined ash pit.

Mowing Machine Match.

The State Agricultural Society of New Jersey will hold a mowing match with machines, on the land of Obadiah Meeker, of Elizabethtown, on the 10th of this month. A premium will be awarded for the best machine.

LITERARY NOTICES.

THE SOLAR COMPASS—This is the title of a neat pocket volume by Wm A. Burt, U. S. Deputy Surveyor of Detroit, Mich. Its object is to describe the mode of using and adjusting his Solar Compass, which was invented by him twenty years ago, has been greatly improved since, and for which he received a premium medal at the World's Fair in London, in 1851. The solar compass obtains the true meridian different from the common compass, and determines the variation of the needle. The sun is the principal celestial object used in surveying lines with this instrument, which only requires a knowledge of the true declination of the sun for each hour of the day. It is a very instructive work for the surveyor, and contains much information not found in common works of the same character. The Instruments are made by Burt & Bailey, mathematical instrument makers, Detroit.

PUTNAM'S MONTHLY—The July number of this sterling periodial is not a whit behind any of its excellent predecessors. The first article is an excellent and somewhat keen review of Irving's Life of Washington. It also contains a review of the Life of Horace Greeley, which appears to be a candid and discriminating article. The article on Rural Objects in England and America, is the best in the number. It describes our forest trees, our birds, and bees, with poetical feeling and language. It states that the English skylark has been successfully introduced into Long Island. We had heard of this before, but have searched many times, unsuccessfully, get a sight of one of them. We really wish this magazine had not adopted the absurd foreign practice of excluding the names of its contributors. It is a contemptible plan.

THE KNICKERBOCKER—*Old Knick*, for July, as usual, is brimful of original literature. The Editor's Table is the most inimitable species of literature in the world. It contains a very beautiful and good scientific article on water by Prof. Mapes. It certainly differs from the Professor's usual style. The *Knickerbocker* has no superior as a literary magazine.

BLACKWOOD'S MAGAZINE—The June number of this renowned Magazine, published by Leonard Scott & Co., No. 54 Gold street, contains articles on Rev. C. Kingsley; the Baltic in 1854; Spanish Intolerance and Insolvency: the Palmerston Administration; Zadec, continued; and the Story of the Campaign, continued. The series of articles on the Crimean Campaign by a Major of Artillery, who writes them in his tent at the seat of war, are the most correct and able of all the accounts published. This number completes the present volume. It is an excellent time to subscribe for the new one.

BOYE'S PNEUMATICS—This is a neat and exceedingly useful work, by Prof. Martin H. Boye, M. D., A. M., of the High School, Philadelphia. It is illustrated with 78 wood engravings, representing the various machines and instruments employed in meteorology, and the whole physics of gases, including vapors. It is a book that was much wanted: it is able, full, and justly deserves an extensive patronage. It is for sale by D. Appleton & Co., this city.

TROW'S NEW YORK CITY DIRECTORY—H. Wilson, Compiler—This new Directory for 1855 is just published, and with a promptness which does the publisher great credit, when we consider that his establishment was recently burned down, consuming much of the matter belonging to the Directory. It is also the best city directory that has ever been published, both on account of its completeness and the manner in which it is executed.