New Mechanical Inventions.

An ingenious Sounding Machine, by which the depth of water is quickly and accurately shown, has been invented by Mr. F. E. Schrom, of Whitewater, Wis. There is an endless graduated indicating belt, combined with the reel that carries the sounding line, to which a relatively low velocity is imparted in such a manner that equal lengths of the line, when winding upon or unwinding from the reel, are represented by much shorter distances moved by any point on the belt. The graduations on the latter are numbered to indicate fathoms and quarter fathoms on the line.

Mr. Daniel H. Merritt, of Marquette, Mich., has patented a new Friction Gearing, the improvement in which consists in making a triangular or V-shaped groove between the bases of the teeth, at a more acute angle than the latter. The teeth or ribs travel faster at the periphery than at the bases, and are consequently liable to the greatest wear at the outer portion of their surface. By the present arrangement, it is claimed that as the ribs wear away they will maintain their original form.

Mr. Lorenzo Meeker, of Oswego, N. Y., has invented a new Lifting Jack by which a heavy weight may be lifted either from the ground or from the top of the device. There is a combination of a vertically sliding bar, a peculiarly constructed clutching device, and a lever fulcrumed on the tubular standard, by which the vertically sliding bar is guided.

In a new Car Wheel patented by Messrs. H. Scheibel, Jr., George M. Seeley, and John Schneider, of Bridgeport, Conn., annular elastic packing is interposed between the cylindrical faces of the tire and the web, the object being to absorb the jar, deaden the sound, and diminish the force of concussion, thus affording a better riding wheel and reducing the wear on the tire.

Mr. L. Morgenthau, of New York city, has devised a new Paper-feeding Machine, which consists of a vertically reciprocating and oscillating casing or receptacle, that is arranged with a narrow longitudinal slot at the curved bottom, and filled with some adhesive substance for the purpose of taking up and lifting a sheet of material at the down stroke of the receptacle and carrying it by the up stroke and by contact with a top stop screw to the feed rolls, so as to be taken up by the same.

Mr. T. A. Blake, of New Haven, Conn., has recently devised a new Ore Crusher, the object being to secure a regular feed and the avoidance of sudden strains upon the frame or the rods of the machine. The materials to be crushed are broken to uniform size and placed in a hopper. A sliding cover is then adjusted to supply the required material to the rolls. The rotation of a roll beneath the hopper causes an even supply of material to fall from the latter to the crushing rolls, where it is reduced to a uniform powder, either coarse or fine, as may be desired. New devices are provided, so that under sudden strain the rolls are permitted to yield without the necessity of overcoming increased resistance.

Mr. Carl A. Schumacher, of Walla Walla, Washington Territory, has devised a new Sewing Machine Shuttle, one advantage of which is that the tension spring and its fastening are permanently attached to the shuttle case, and consequently none of the parts are likely to become mislaid or lost.

A new Cross Tie for railways devised by Mr. David Horrie, of Keokuk, Iowa, consists of a cast or wrought iron tie made of a broad bearing surface, center bottom rib, and with lateral top flanges, that bind on the base of the rails and firmly secure the same. With this are combined straight screw bolts, having spiked heads that pass in grooves of the tie across the bottom of the rails.

Mr. Clark P. Hayes, of Brooklyn, N. Y., has invented a Machine for Cutting and Grinding Logwood, which is intended to take the place of the separate machines now used for that purpose. It works rapidly and separates the fine particles from the coarse chips, which last are conducted away and reground.

Mr. Elson Towns, of Cisne, Ill., has devised a new Governor for Steam Engines, which is so contrived that the relation of the centrifugal force of the rotating balls to the resistance changes as the balls rise or fall; and the relation of the motion of the balls to that of the moving sleeve is also variable, so that the governor is most sensitive when sensitiveness is required.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion.

NEW BOOKS AND PUBLICATIONS.

UPLAND GAME BIRDS AND WATER FOWL OF THE UNITED STATES. By A. Pope, Jr. Published by Scribner, Armstrong & Co., 743 and 745 Broadway, New York city.

We have received the first part of one of the most elegant ornithological works that has been published since Audubon produced his colossal volumes. The idea is to present a series of exact illustrations of many of the principal game birds and water fowl of the United States, drawn from and colored to the life by an artist sportsman who has studied them for years, and whose ability as a painter in water colors is of high order. The sketches, which are reproduced in fac-simile in the highest style of chromo-lithographic art, represent the male and female of each variety of birds, and the descriptive text is taken from Wilson's, Audubon's, Baird's, Cone's, and other standard ornithological books. The entire work is being published in the most sumptuous manner, and when complete will form one of the handsomest productions of a publishing house already renowned for the artistic excellence of what it puts forth. The part before us relates to the American Snipe and the Green Winged Teal. The four following parts—there are to be five in all—describe the woodcock, mallard duck, quail, black duck, ruffled grouse, blue billed duck, prairie chicken, and red headed duck. The work is sold by subscription only, at $2.50 per part.

AMES' COMPENDIUM OF PRACTICAL AND ORNAMENTAL PENMANSHIP. By Daniel T. Ames. Published by A. J. Bicknell & Co., 27 Warren St., New York. Price, cloth, $5.

This is a large quarto volume containing 48 plates, finely executed by photo-lithography, and placing before the penman a great variety of models for imitation, ranging from simple elements of letter formation to the most elaborate engrossing. Twenty ornamental alphabets (many entirely new) are embodied, besides numerous designs for borders, monograms, and the various formal documents, such as resolutions, testimonials, etc., in preparing which the penman's skill finds its crucial test. The author states that it is the most complete handbook of ornamental penmanship extant. It is very handsomely published.

PALLISER'S AMERICAN COTTAGE HOMES. Published by A. J. Bicknell & Co., 27 Warren St., New York. Price $5.

The above-named publishing house is doing valuable service in its frequent publication of copiously illustrated works containing designs for dwellings which are not only moderate in price but in accordance with a constantly improving popular artistic taste. American village architecture has long been remarkable for lack of beauty, chiefly perhaps on account of the rapidity with which new towns spring up in this country, and the necessity of building at low cost. Now that the best architects do not think the planning of a workman's cottage unworthy of their skill, we may look for the application of better principles both in construction and exterior appearance. The present work is a notable instance of what may be done toward adapting really tasteful and new designs to the exigencies of moderate outlay. Here are 50 designs, each giving the necessary plans, elevations, and perspectives of cottages, none costing more than $3,500 to erect complete, and ranging from that figure down to as low as $325 for a very neat 2 room 1½ story dwelling. All are tasteful, many picturesque and elegant. They are intended for the country and look rural, which is much more than can be said of the ineffectual attempts to imitate French city architecture on a reduced scale, which of late years many architects have made, in planning country homes. Full forms of specifications and agreements are given, so that the reader has only to select his design and make a contract with a builder to have it constructed.

PRACTICAL STUDIES IN LINEAL DRAWING. Designed and engraved by E. Becker. Price 75 cents. For sale by the author, Box 140, Stapleton, Staten Island, N. Y.

This is a portfolio of six finely engraved plates, exhibiting mouldings, volutes, and pedestals, and the Tuscan, Ionic, Doric, Corinthian, and Composite orders of architecture. Problems and solutions and various explanations are engraved upon the plates.

Notes & Queries

(1) C. L. asks: Is there any way to prevent a lignum vitæ block from checking? I have a piece that I use for cutting stencil plates on, and it has begun to check quite badly. I should like to prevent it without injuring the wood. A. Oil would have a tendency to stop it if frequently applied. A coat of paraffin would close the pores and prevent the action of the air upon the fibers. It might be bound with an iron ferule.

(2) F. B. asks what papier mache is composed of for making ornaments, also how to mix it for casting. A. It is a mixture of paper pulp and hot melted glue; the mixture is poured or cast while hot in moulds which may be made of plaster of Paris, and as soon as it sets by cooling is removed from the mould, and allowed to dry by exposure to the air; and when dry it is varnished or polished, according to the degree of finish that is required.

(3) S. A. H. writes: Please inform me how screw taps are hardened; those we have with the dies are a reddish color, and stand quite well, but we cannot make any that will stand at that color. A. It may be that you harden at too high a heat. Sprinkle pulverized yellow prussiate of potash over your taps. When they are heated to a dull red, again place them in the fire and increase the heat for a few moments until the prussiate is thoroughly fused or fluxed over the surface, and then immediately plunge and shake them (so that they will chill quickly) into and under clear cold water. When thoroughly cool, the tap or taps are to be removed from the water, then cleaned, polished, oiled, and tempered.

How are those collapsible tubes made used to put artists' oil colors up in? A. On very much the same principle as lead pipes are made—the metal is heated and drawn (in dies) to the required shape by pressure.

1. I have a Daniell battery (zinc was cast from chain pump buttons). It will not work sometimes for a long time, and then very weak. I would like to know the reason? A. It is likely that your battery zinc contains lead. 2. Can the sulphate of copper solution be made so strong as to impair the action of the battery? A. Not in Daniell's form of battery.

(4) J. L. P. says: In the SCIENTIFIC AMERICAN of December 15, 1877, under "Notes and Queries," is the following by H. R. H. (16): "What is the correct answer to the following example? 714—·714÷(·34—·034 ×·25 of 6)." There were two answers given, 1554 and 711·52942+. In your answer you say the second solution is the correct one. I claim the first (1554) to be the correct answer, and give my reasons below. A. The statement is ambiguous; it may be rendered in four different ways, thus: 1. (714—·714)÷[(·34—·034)×·25×6] =1554. 2. (714—·714)÷[·34—(·034×·25×6)]=2468·117. 3. 714—[·714÷[(·34—·034)×·25×6]]=712·444. 4. 714—[·714÷[·34—(·034×·25×6)]]=711·529. In the quotients, the decimals are carried out to only the third place.

(5) M. H. R. says: It is desired to deaden the floor in a schoolroom. The room is about 45 x 30, the ceiling underneath is of ⅛ inch boards. What would be the best and cheapest mode of doing it? A. Lay down two or three thicknesses of building paper under the floor plank.

(6) A. S. asks: How are blue photographic pictures made? A. First solution: Potassium ferrocyanide, 120 grains; water, 2 ozs. Second solution: Ammon-ferric citrate, 2 ozs.; water, 140 grains. Mix the separately made solutions, filter into a flat dish and float plain photographic paper on it for 3 or 4 minutes. Dry the paper in the dark and expose it to strong sunlight under the negative for 8 or 10 minutes. Wash the print in running water, dry, and mount. A little gum arabic in the bath is said to greatly improve the picture.

(7) J. M. S. asks: What are the coloring matters used by confectioners—red, blue, yellow, and green? A. Blue: Indigo powder, soluble indigo (sulphindigotic acid), Prussian blue. Yellow: Saffron, Turkey and Persian yellow berries, quercitron, fustic, and aluminous lakes of these. Mixtures of blue and yellow make green. Red: Cochineal, carmine or lake, Brazil wood lake, madder lake. Carmine is often adulterated with vermillion (mercury sulphide); it should, if pure, dissolve without residue in strong aqua-ammonia.

(8) A. H. J. writes: Can you inform me how I can obviate the following difficulty with my cook stove? A thick, black, tarry substance almost continually oozes through the joints of the pipe and drips onto the stove and carpet, and has a strong, disagreeable odor. The draft is good; the wood used is beech and maple, thoroughly seasoned. The pipe is nearly new and perfect, about 16 feet in length from stove to chimney, with only one elbow. The stove, with this exception, is an excellent one. A. The tarry substance you mention is a product resulting from the destructive distillation of wood, and consists principally of pyroligneous acid. Your stovepipe acts as a condensing worm to a still or retort, such as is used in chemical manipulations; in fact, you are making pyroligneous acid; but as you seem to take no interest or pleasure in this manufacture, we suggest as a means of preventing it that you connect your stove directly with a brick chimney, so as to use as little metal stovepipe as possible.

(9) F. H. S. asks for a good indelible ink to use with stamps? A. Mix equal parts black oxide of manganese and hydrate of potash, heat to redness, and rub with an equal quantity of smooth white clay into a paste, water being added for that purpose; or, sulphate of manganese, 2 drachms; lampblack, 1 drachm; powdered loaf sugar, 4 drachms; rubbed into a paste with water. After stamping, dry the linen and wash well in water. Mix aniline red or rubine extra, 2 to 4 drachms; alcohol and water, each 7 ozs.; glycerin, 15 ozs.; heat and rub together with a little tannic acid or sumac extract and alum water. For blue, use soluble water blue (aniline) dissolved in a sufficient quantity (about 150 parts) of hot dilute glycerin. Soluble nigrosine may in a similar manner be used for black ink.

(10) F. W. M. asks how to hold India ink in solution like that prepared by Winser & Newton? A. The ingredients are digested for two hours at a high temperature in a Papin's digester. A drop of clove oil should be added and a little ox-gall.

(11) J. V. asks: What is the feeding principle of the German students' lamp? A. The equilibrium of a liquid in communicating vessels. Consult some text-book on Natural Philosophy.

Will ordinary rubber bands answer for making a coating or cement by dissolving in bisulphide of carbon? A. No; use gum rubber or caoutchouc.

1. What is the cheapest manufacture of ammonia? A. By decomposing the solution of the sulphate or carbonate obtained from the liquor of gas works, by slaked lime aided by heat. 2. About what is the cost of manufacture per lb.? A. If you refer to aqua or liquor of ammonia, crude, 10 cents; chemically pure, 75 cents.

(12) D. S. asks: Is there any method of keeping the worm out of white hickory? A. The application of a dilute solution of tannin mixed with about 10 percent of zinc chloride is said to preserve the wood to some extent.

(13) J. S. asks: Is it practicable to manufacture ice by utilizing the cold given out by the expansion of compressed air (say to five atmospheres)? A. Yes, but the processes involving ether, anhydrous sulphurous oxide and other chemicals are more economical.

(14) S. S. asks: What can be added to common black writing ink to make it a copying ink? A. A little loaf sugar dissolved by heat.