purpose. A. Common gas pipe notsuitable; you should use sap-welded tubes. 2. At what speed of said engine can I attain the greatest power? A. With the same pressure, the higher the speed the greater the power.

(20) W. S. K. asks: With a given cylinder, say 12 inches diameter, why will one engine cut off at ¼ stroke and another at ½ or ¾ stroke; that is, what different conditions must exist? Will not the one which cuts off at ¼ stroke use less steam and thus result in a saving of fuel? Understand that both engines are same horse power. A. The one with the short cut off will be most economical, but will not give out so much power as the other with a given pressure of steam.

(21) J. H. C. W. writes: About two months since I moved into a new house, and although, of course, we are constantly using hot water, the water is sometimes very thick and muddy with iron rust, always darkly tinted; it is worse when the range fire has been fiercer than usual, ironing days, etc. Can you tell me any way of stopping the trouble? A. We know of no better method than heating up the water in the tank and then running it off as rapidly as possible, repeating the operation till the pipes and water back are cleaned out.

(22) C. L. J. asks for a receipt for coloring white soap a light yellow. I am making an excellent soap, but find it difficult to sell it because it is not yellow. I have added rosin, but that makes it too dark. A. Color with solutions of annatto and turmeric.

(23) P. J. B. asks how to tin light wire work, and wants a metal that will run freely and smoothly and not leave any drops, as there is no opportunity to brush or rub off any superfluous metal. I have used all ordinary alloys used in tinning, to wit: pure tin, tin and lead; tin lead and bismuth; tin, lead, antimony, and bismuth; and have cleaned my work (before dipping) in dilute sulphuric acid, then thoroughly rinsed in pure cold water, then dipped in muriate of zinc, then into my bath of metal, which is covered with tallow to the depth of one-eighth of an inch. I have frequently found wires with a scale that I cannot remove with the sulphuric acid. In dipping a piece of straight work, the wires being about ten inches long, if I draw it out lengthwise of the wire the metal will remain on too thickly, and if I attempt to shake it, it will cool and set in ridges. Do you know of any method for doing away with these difficulties? A. Pure tin, or tin with a little bismuth, will answer about as well as anything. Try dipping the tinned article in very hot grease until the coating is equalized. In such work the wire is usually tinned in the coil and finished in the grease pot or by passing through a loose draw-plate on cooling. If the wire is much oxidized use a stronger pickle, or give a longer exposure in a dilute hot pickle. If oily, dip in hot potash solution and rinse in plenty of water first.

(24) J. T. W. writes: 1. I propose laying a two inch wrought iron pipe, 5,000 feet in bed of a stream which falls in that distance 20 feet. How much water would said pipe deliver by natural flow? A. 16 cubic feet per minute. 2. How high would it rise vertically from lower end? A. As a jet, not over about 12 feet, but in a steady pipe the height of the head. 3. With a stream pump attached how much could be drawn through it? A. 2·66 cubic feet per minute.

(25) A. W. D. writes: We have a backlash in the bevelgearing on crank shaft and upright shaft in a flouring mill. Some say that it is caused by the governors on engine, and some say it is caused by mill machinery; and to test the governors I weighted down the stem so as to use boiler pressure, and regulated speed by the throttle valve, and it backlashed just the same as it did when running with the governors. Increase of speed increases the trouble alike in both cases. Was that a sufficient test for governors? We have an irregular feed on one of the burrs. Do you think that would cause a backlash? A. Your fly wheel is too small. Increase its diameter at least two feet.

(26) A. S. F. asks: 1. Can you tell me how many pounds (troy) of metallic sodium and water are required to produce ten cubic feet of hydrogen gas (at 60° Fah.)? A. 1 lb 6 oz. sodium and 1 lb. 2 oz. water. 2. What are the relative weights of ten cubic feet of hydrogen and a like volume of atmospheric air (at 60° Fah.). A. Ten cubic feet of hydrogen weigh about 0·77 oz.; the same volume of air under like conditions about 11·16 oz. 3. What measure and weight of oxygen gas will this quantity of hydrogen require to form water? A. 5 cubic feet, equivalent to about 6·16 oz. 4. How much oxygen does atmospheric air contain on an average? A. About 20 per cent. 5. How much oxygen can be obtained from chlorate of potash. A. 16 oz. will yield about 5 cubic feet of the gas.

NEW BOOKS AND PUBLICATIONS.

ILLUSTRATED CATALOGUE OF THE PLUMBING AND SANITARY DEPARTMENT OF THE J. L. MOTT IRON WORKS. 1881.

Contains upwards of six hundred engraved illustrations of as many styles of plumbing and sanitary appliances, lamp pillars, and stable fixtures. The high character of the products of this establishment, both with regard to artistic design and the quality of the iron and enamel, is known everywhere. The scientific construction of the various sanitary devices here illustrated will commend them to prudent house owners and architects. The stable fittings in cast and wrought iron show some remarkably artistic designs.

BRIGHT FEATHERS. By Frank R. Rathbun. Auburn, N. Y.: the Author. Part I. Quarto, paper, pp. 24. $1.

Mr. Rathbun has chosen the purple finch for the initial number of this series of ten or more illustrations of the most attractive of the birds of our northeastern States. Each number will carry a plate figuring the male and female of the species described. The figures are carefully drawn from nature and colored by hand.

MODERN ARCHITECTURAL DESIGNS AND DETAILS. New York: Bicknell & Comstock. Parts IV. and VI. $1.

Part IV. comprises plates 25 to 32; store fronts and details; plans and elevations of a country house by Cabot & Chandler, Boston, with many details of porches, windows, gables, etc.; cornices and belt courses. Part VI, plates 45 to 48, contains perspective views, plans, and elevations of two country houses, with many exterior and interior details. Part V. was noticed some weeks since.

[OFFICIAL.]

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A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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