ink specialtion and unusual forms and kinds of ink, such as safety ink, sympathetic ink, stamp inks, etc. while the important subject of printing ink is fully treated. Preserving agents for ink, the change of color in old documents and the memous of making faded writing ink legible come in for their full share of attention. This is the only treatise devoted entirely to the subject in print in the English language and is an important addition to technical literature.

THE HARDWOOD FINISHER. With rules and directions for finishing in natural colors and in antique, ma-hogany, cherry, birch, walnut, oak, ash, redwood, sycamore, pine, and all other domestic woods. Compiled all other domestic woods. Compiled and edited by Fred T. Hodgson. New York: The Industrial Publication Company. 1892. Pp. 94. Price

This excellent work, with its very practical aspec seems to cover a field that has been perhaps somewhat neglected. It is exceedingly practical, and with numer ous formulæ for all kinds of stains and wood dyes, as well as finishes, is one that is to be found of value to many operatives.

LE CHAUFFAGE ET LES APPLICATIONS DE LA CHALEUR DANS L'INDUSTRIE ET L'ECONOMIE DOMESTIQUE. Par Julien Lefevre, Professeur Suppleant a l'Ecole de Medecine de Nantes, Pro-fesseur a l'Ecole des Sciences. Avec 188 figures intercalees dans le texte. Paris: Librairie J. B. Bailliere et Fils. 1893. Pp. 356.

The French aspect of this book is evident in the title, and the very large ground which it. undertakes to cover is largely devoted to domestic heating, although other heating finds a place in it, and its numerous il lustrations and excellent arrangement of pictures indicate good judgment on the part of the editor and pub-

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SCIENTIFIC AMERICAN

BUILDING EDITION.

DECEMBER NUMBER.-(No. 86.)

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- 3. A colonial residence at Newton Highlands, Mass Perspective view and floor plans. J. W. Beak architect, Boston. A picturesque design.
- 4. A pretty cottage erected at Bridgeport, Conn., a cost of \$1,600. Floor plans, perspective, etc. A. M. Jenks, architect, Bridgeport, Conn.
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- 14. Miscellaneous contents: Some of the merits.-Water tight cellars.-Read this with care.-Improve education of customers.—Erection of additional buildings .- Concave sounding boards .- A high railway bridge.-A complete steel house front, illustrated.-An improved woodworking machine.-Finely carved woodwork, illustrated.-Steam and hot water radiators, illustrated .-Plaster of Paris.-Disinfection by means of sulphur.—A novel newspaper building.—Fine steel ceiling in an art gallery.

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Minerals sent for examination should be distinctly marked or labeled.

(4604) O. C. asks: 1. What speed can be had with a 16 foot boat, 4 feet beam, using an engine 21/2 inches hore, 3 inches stroke at about 60 pounds steam pressure? A. You should be able to run the boat 6 miles per hour. 2. What should be the diameter, pitch, and speed of the propeller to give best results? A. Propeller wheel should be 18 inches diameter, 36 inches pitch and make 250 turns per minute. 3. Should the propeller have two or three blades? A. A three-blade wheel is preferred. 4. What size boiler would be required and would the pipe boiler described in the Scientific American Supplement be suitable? A. A vertical tubular boiler having 20 square feet of actual heating surface with shell 22 inches diameter by 36 inches in height, 33 tubes 11/2 inch, will give all the steam required. The No. 3 pipe boiler described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 702, with 8 inches addition to the length, will make a safe boiler your property.—How to catch contracts.—The in which you carry 100 pounds steam pressure if de sired, and large enough for the above speed.

(4605) R. T. McK. writes: Will you please answer me through your columns why it is that you can pump up a higher air pressure than your steam pressure by the gauge on a double acting air pump, the steam and air cylinders being of the same diameter. and the pistons operating on the same piston rod? A The difference between the initial pressure in the steam cylinder and final pressure in the air-compressing cylinder is due to the difference in the mean pressure for the expansion of steam and the mean pressure for the compression of air. This is at once apparent to the eye when examining the indicator cards of equal sized steam and air compressing cylinders. The mean engine pressure for 70 pounds at % cut-off is theoreti cally 52 ponnds per square inch. The mean adiabatic pressure of the air cylinder for delivery of air at 100 pounds pressure is 50 pounds, while the mean isothermal pressure is but 30 pounds. The absorption of the heat of compression by water injection or jacket cooling brings the extremes to a mean, which, if 1/8 is ab sorbed, will make the mean pressure of the air cylinder about 43 pounds per square inch, with 9 pounds as the margin for compressor friction.

(4606) R. M. asks: 1. Is smoke a wet vatery) or dry vapor? A. Smoke 1s more or less mixed ith the vapor of water, part of which is derived from the moisture in the fuel and another portion from the xidation of the hydrogen forming part of the fuel. 2. Car sate of the fuel. 2. Car between the fuel and another portion from the xidation of the hydrogen forming part of the fuel. 2. Carbon, electric light, J. Clegg. watery) or dry vapor? A. Smoke 1s more or less mixed with the vapor of water, part of which is derived from the moisture in the fuel and another portion from the oxidation of the hydrogen forming part of the fuel. 2. What weight would a ball 100 pounds indicate on a balance if dropped from a height of 100 feet? A. The weight multiplied by the fall is equal to 10,000 foot pounds. If the balance arrests the fall of the ball in 6 inches after contact, the average impact force is 20,000 pounds. See Scientific American Supplement, No. 862, on impact or the force of percussion.

(4607) G. C. W. asks how to bleach the hair of an animal. A. Gaseous chlorine and hydrogen peroxide are effectual agents in bleaching hair. The hair should be thoroughly cleaned, with a warm solution of soda, then washed with water. While moist it is put into a jar and chlorine gas introduced, until the air in the jar looks greenish. Allow it to stand for twenty-four hours, and if necessary repeat.

(4608) T. H. says: 1. It is proposed to deliver water in an inch pipe one mile distant over an elevation 120 feet high, the point of delivery is 25 feet lower than the starting point. It is asserted that it would require 75 per cent more force power to deliver at the summit and let it go down by gravity than to continue the pipe the whole distance. Can you throw light on it? A. It will require 52 pounds pressure and the additional pressure due to friction to deliver the water at the summit of the siphon. The down leg can only relieve the pump pressure to the amount of a vacuum, or 14.7 pounds, which may be offset by the friction in the down leg of the siphon. The difference in length of the two legs of the siphon may make a trifling difference only, whether delivery is through the whole length or discharged at the top. 2. Suppose that a shell made of strong steel 11/4 feet in diameter, with a cavity in the center large enough to hold 2 ounces of powder (11/2 inches), with a vent of a size to admit the smallest possible wire that would conduct electric fluid, had electricity applied, would the powder ignite? Would there be an explosion, or what would there be? A. The powder would explode and create a pressure of probably 40,000 pounds per square inch, which would fizzle out through the vent and burn out the wire.

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An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office Scientific American, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 29, 1892,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

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Bed, folding, J. Ganey. 488,867 Belt, electric, J. H. Johnson. 487,185 Belt fastener, E. L. Matteson. 487,185 Belt fastener, E. L. Matteson. 487,105 Bench dog, C. A. Wayland. 487,106 Bevel, W. G. Avery. 487,001 Bicycle, S. H. Kimball. 487,001 Bicycle, S. H. Kimball. 487,001 Bicycle brake, W. T. Lewis. 486,395 Bicycle saddle support, E. M. Staples. 487,001 Bicycle brake, W. T. Lewis. 486,395 Bicycle saddle support, E. M. Staples. 487,001 Bit brace, A. Knudsen. 487,123 Boliter, C. H. Stochting. 487,124 Boller furnace, W. R. Parks. 488,024 Boller furnace, locomotive or marine, F. Barclay, 488,024 Boller furnace, locomotive or marine, F. Barclay, 488,024 Boller furnace, locomotive or marine, F. Barclay, 488,023 Bolster plate, D. B. Oli ver. 488,002 Book, blank, H. H. & F. H. Hoffmann 487,014 Book guard, blank or other, J. D. Mets. 487,014 Book guard, blank or other, J. D. Mets. 487,014 Book guard, blank or other, J. D. Mets. 487,014 Boring apparatus, O. Lentz. 488,007 Borring apparatus, O. Lentz. 488,007 Borring apparatus, O. Lentz. 488,007 Box. See Confectionery or other box. File box. 80x. See Bit brace. 80x. 80x,000 Box. 80x. See Bit brace. 80x,000 Box. 80x. 80x,000 Box. 80x,000 Bo	berg	487,194
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Dox	Bevel, W. G. Avery	487,010
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Dox	Bicycle saddle support. E. M. Stanles	486,935
Dox	Binder, C. H. Stoelting	486,989
Dox	Bit brace, A. Knudsen	487,123
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Dox	Boiler furnace, W. R. Parks	486,955
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Dox	Boiler furnace, locomotive or marine, F. Barclay,	486,924
Dox	Bolster plate. D. B. Oli ver.	486.89
Dox	Book, blank, H. H. & F. H. Hoffmann	487,014
Dox	Book guard, blank or other, J. D. Mets	487,191
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Filter, water, J. Davis
Fire escape, portable tower platform, J. Volz et al
File box, Ohmer & 487,106 File, check, F. Tremblay. 485,932 File, check, F. Tremblay. 486,932 File, check, F. Tremblay. 486,932 File, paper, W. I. Ohmer . 487,106 File, paper or music. W. Jeschke . 486,859 File, paper or music. W. Jeschke . 486,859 File arm signal apparatus, auxiliary, C. E. Scribner . 487,135 Fire escape, J. B. Stott 487,135 Fire escape, portable tower platform, J. Volz . 487,135 Fire escape, portable tower platform, J. Volz . 487,135 Fire escape, portable tower platform, J. 487,039 Fire kindler. S. Elsinger . 486,936 Filour bolt, W. D. Gray . 487,039 File kindler. S. Elsinger . 487,039 Fuel feeder, flui d. E. T. Williams . 486,938 Fumigator, R. Campbell . 487,173 Furnace. See Boiler furnace 487,173 Furnace. W. Stubllebine . 487,173 Furnace W. Stubllebine . 486,930 Game counter, W. C. & F. N. Wels . 486,931 Gas meter diaphragm A. Henning . 487,051 Gas washer or scrubber, J. C. Chandler . 486,937 Gate. See Bridge gate. Tilting gate 688,937 Gate. See Bridge gate. Tilting gate Glass articles, securing designs on, A. A. Graeser . 487,103 Governor, engine, W. H. Lawrence . 487,175 Governor, engine, W. H. Lawrence . 487,175 Grave box cover, I. Scott . 486,938 Guard. See Book guard 486,938 Guard. See Book guard 486,938
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