

after it is dry, give it a light coat of shellac dissolved in alcohol. Lay the oil on as thin as possible or it will not dry. Ordissolve 1 ounce beeswax (genuine) in 1 pint boiled linseed oil, using a low heat. Rub it well in, and in general follow directions as above.

(2643) F. L. asks: 1. Will a clock (with a pendulum) and a watch which both show the same time at the equator show the same hour and minute if carried to any point between the equator and pole? A. The pendulum beat will gain on the watch as it is carried toward the poles. A pendulum beating seconds at the equator should be 12-100 of an inch longer to beat seconds at the latitude of London, England. 2. Does cutting off the forests increase the amount of water or volume of a river? If so, would the amount of increase be lasting? A. Cutting of the forests may not materially lessen the yearly rainfall. The forests retain the water, lessen the flood wash, and thus equalize the climatic effect of atmospheric moisture. 3. What is the length of the day at the tropic of Cancer? A. The length of the day at the tropic of Cancer is 12 hours when the sun on the equator, at all other times it varies with the sun's declination. For the solution of the problem see Norton's "Astronomy." 4. What is the difference between heat and sheet lightning? A. Heat lightning is the distant flash that is not directly seen. Sheet lightning is seen in its broad flight from cloud to cloud, generally in complex thunder storms.

(2644) F. McL. asks: 1. Which is the better way to color a meerschaum pipe, with or without a false bowl? Isn't there a preparation that they can be boiled out in to help the coloring? A. Smoking is the best thing. There is a quick process, but it is kept a secret. They are sometimes boiled in wax. You might refer to queries 2364 and 2474. 2. What is the best way to select a meerschaum? A. Buy from a maker of reputation. No general rule of value can be given. 3. Is there any way to rid a building of cockroaches? A. Bubach or erythrum is highly recommended. It must be fresh. Also powdered borax and Persian powder have been found efficacious.

(2645) H. H. B. asks: 1. How to harden brass wire after hard soldering? A. Burnishing it will do this to a certain extent. 2. The unit of measure used in the sizes of watches, like size 18, 16, 6, etc.? A. The size is an arbitrary standard; in Europe the line (1-12 inch) is used; 16 size corresponds to 18 lines. 3. The unit of measure of watch glasses? A. The line (1-12 inch) is the unit. 4. Is there any thin substance which, brought between a permanent magnet and the bar which connects the poles, to cut off the magnet's influence from said bar? A. No; except a piece of polarizable metal such as iron, but none in the sense of your question. We do not understand your fifth query.

(2646) Photog. asks: Can you inform me through your paper how to prevent show windows (in stores) from frosting during cold weather? A. Ventilate from top of window casing by several three or four inch openings, with hoods to exclude rain.

(2647) Plumber asks: Will you be kind enough to send me a sample copy of the "Plumber's Problems"? A. We can supply you with the book called "Plumbing Problems," price \$2.

(2648) S. M. H.—It would be impossible from the specimen sent, without further data, to identify the plant whence the sample was derived. The substance is not a fiber, in the true sense of the term, but is of the nature of straw. It might be used in the manufacture of paper, but it has no fibrous quality that would cause it to hold together when twisted into twine. In addition, it is wanting in strength.

(2649) W. F. B. asks if any other color of hektograph ink may be made besides the violet, which is the only one he can find in the market. If it can be made in black, red, green, blue, or any other colors, please state what ingredients to use and how to make it? A. For hektograph inks use any colored aniline dissolved in a very little alcohol and diluted with water.

(2650) A. P. McR. wants a receipt for flint lime glass. A. The following are given as formulae for flint glass:

Table with 3 columns: I, II, III. Rows: Silica, Oxide of lead, Carbonate of potash, Nitrate of potash.

(2651) W. H. B. asks: Which profession, civil engineering or mechanical engineering, offers the better opportunity to a young man at present? A. So much depends on opportunities that a general answer is difficult. The profession of mechanical engineer is more apt to lead to permanent positions, and is a stepping stone to electrical engineering. In civil engineering the first steps are more difficult, and many positions, such as on railroad work, are only temporary. The different branches cannot well be enumerated. They include draughting room work, supervision of machine shops, surveying, bridge building, etc.

(2652) V. G. Van S. asks how mercurial thermometers are made to ring an alarm for heat and cold. To tell when the heat has reached a certain point and when it sinks a few degrees below. As glass is really a non-conductor I do not see how a contact point is made with the mercury inclosed in a tight tube of glass, especially when you want the alarm at different degrees of heat. A. Platinum wires are soldered into the glass, penetrating the walls of the tube and coming into contact with the mercury as it rises or falls. On this principle electric connections may be made or broken as desired.

(2653) H. W. S. asks: What is the reason for writing aluminium instead of aluminum? A. It is a matter of taste. Either spelling can be used. The names of the newly discovered metals generally terminate in um, yet many of the Latin names for metals terminate in um, as plumbum, ferrum, argentum, etc. Aluminum is more etymological, aluminium more in accord with modern nomenclature.

(2654) J. C. F. asks for the receipt for making a hektograph. A. You will find full directions and illustration of above in our SUPPLEMENT, No. 438.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

Aquarium.—I would suggest to inquirer No. 2537 that he would be much more likely to have a permanently successful aquarium if he made the frame of three-quarter inch angle iron riveted with copper rivets. Twenty feet will be the length required and will cost about thirty cents. First make the entire frame, uniting the pieces together at corners, and then screw it down to the wooden base. The bottom should be lined with glass, slate, or a layer of cement and the sides made of plate glass well bedded in same. Aspinwall Bath Enamel is excellent for painting all parts exposed to water. See Dr. Bateman's delightful book, "Fresh Water Aquaria," published by Gill & Co., London, 1890.—WILLIAM H. PATTERSON.

NEW BOOKS AND PUBLICATIONS.

A RUSSIAN COUNTRY HOME. By Carl Detlef. Translated from the German by Mrs. J. W. Davis. Photogravure illustrations by Walter H. Goater. New York: Worthington Co. Pp. 311.

LEGAL HYGIENE, OR HOW TO AVOID LITIGATION. By A. J. Hirschl, of the Iowa Bar. Davenport, Ia. 1890. Pp. 203, iii.

This work is devoted to the tricks and subtleties that may be practiced on the unsuspecting and to the means for meeting legal difficulties. It is spiritedly written and makes an interesting treatise of a very practical tone.

STATISTICS OF RAILWAYS IN THE UNITED STATES TO THE INTERSTATE COMMERCE COMMISSION FOR THE YEAR ENDING JUNE 30, 1889. Washington, Government Printing Office. 1890. Pp. 566.

But one commentary can describe this work, which is the statement that within its limits it is quite exhaustive. It gives the mileage, earnings, incomes, and other data of the United States railroads in such clearly classified form as to be invaluable to those interested.

SOUND, LIGHT, AND HEAT. By J. Spencer, B.Sc. London: Percival & Co. 1890. Pp. viii, 223.

The author of this work is headmaster of the science department, Bradford (England) college. The work is neatly printed, well illustrated, and is prepared as a class book for the elementary stage of the science and art department. Although calculated for this special horizon, its usefulness is not diminished thereby, and it is a good introduction to these three branches of physics.

TO INVENTORS.

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 unequalled 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 December 2, 1890, AND EACH BEARING THAT DATE.

Table listing inventions with patent numbers, including items like Air brake, Alarm, Animal trap, Annunciator, Arbor, Ash and cigar receptacle, Bauer, Axle box, Axle box, car, A. L. Humphrey, Bang attachment, Bank tellers, device for the protection of, Johnson & Bergstrom, Barber's chair, E. E. Peck, Barrel, C. E. Parks, Barrel hoop, J. M. Conway, Basins, waste pipe connection for, E. S. McClelland, Bat, cricket, W. & J. B. Heighington, Bath, See Vapor bath, Battery, See Galvanic battery, Secondary battery, Bearing boxes, automatic adjuster for, H. L. Hopkins, Bed bottom, D. M. Bone, Bed bottom, O. S. Foster, Bed bottoms, attachment for spring, O. S. Foster, Bed spring, E. W. Locke, Belt tightener, W. King, Bicycle, J. E. Dunlop, Bicycle, S. Watson, Bicycle lock, G. R. Fuller, Bicycle lock, Q. A. Smith, Bicycles, package holder for, F. Lynam, Bleaching apparatus, F. E. Brown, Boiler, See Steam boiler, Water tube boiler, Boilers, apparatus for regulating steam in, A. M. Butz, Bolt heading machine, F. Mutimer, Boot calk, A. J. Armstrong, Boot or shoe sole, J. S. Williams, Boot tree, Gillard & Loewer, Boot treening machine, A. E. Fowler, Bottle, dose measuring, H. S. Herrick, Box, See Axle box, Letter box, Powder box, Stuffing box, Bracket, See Scaffold bracket, Brake, See Air brake, Car brake, Vehicle Brake apparatus, hydraulic, J. B. G. Canet, Breast strap slides, manufacture of, E. L. Howe, Brick mould sander, R. P. Roach, Bridge, suspension, G. M. Wildin, Bridge iron bending machine, J. & M. G. F. Buck-ley, Brooder, G. H. Bishop, Brush for blacking or oiling boots, A. Smith,

Main index table listing inventions with patent numbers, including items like Buildings, facing for walls of, G. Konigsberg, Burner, See Lamp burner, Vapor burner, Buttonhole cutter, E. O. Bartholomew, Cages, feed cup for, H. E. Hendryx, Calendar, C. A. Dickinson, Caliper adjustment, A. Munch, Can clean, A. E. Minton, Camera, See Photo camera, Cane stripping machine, W. M. Carr, Cane, etc., walking, E. Hofel, Car brake, W. R. Zeigler, Car coupling, C. Schryver, Car cot, for training animal, A. Schneider, Car coupling, S. Ventress, Car door, Wagner & Seath, Car mounting, railway, H. Resley, Car seat, G. W. Cushing, Car stake, railway, J. C. Barber, Car track, H. H. Channing, working, O. R. Chase, Cars, rod for coupling, J. B. Lewis, Carriage, child's, P. Gendron, Carriage top, J. D. Whitney, Carrier, See Cash carrier, Cartridge for breech-loading cannon, S. Seabury, Cash carrier, F. S. Church, Caster colter and jointer, S. Storr, Cast-iron metal, machine for, T. J. Close, Chain, drive, J. Appleby, Chair, See Barber's chair, Chair, backs, machine for moulding, L. A. Chisholm, Cheese cutter, O. W. Smith, Chopper, See Vegetable chopper, Clay burning kilns, utilizing waste heat of, J. S. Baldwin, Cleaner, for leather, Foot cleaner, Clip, Detector bar clip, Clock alarm, electric, M. W. Tiedemann, Clocks, winding arbor for, F. L. Shaw, Closet, See Water closet, Clothes line, endless, W. W. Hatfield, Clothes line holder, T. Chapin, Clutch, friction, Mc Bride & Fisher, Clutch, friction, J. Walker, Cockle separator, F. W. Howell, Cocks, apparatus for controlling and registering liquids drawn through, R. Jewell, Collar, for training animal, A. Schneider, Communiting materials of a viscous or pasty nature, process of and apparatus for, G. W. Goetz, Compound engine, J. H. Eickershoff, Condenser plate, corrugated, E. Theisen, Confection, for making, G. H. Chase, Cordage, machine for making, W. H. Avis, Cork pulling appliance, A. J. Parker, Corn cutter, J. H. & C. Burkholder, Corn, machine for breaking shelled, A. Ball, Cot or lounge, J. A. Bishop, Cot, etc., opener and nicker for, G. H. Chase, Coupling, See Car coupling, Electric wire coupling, Hoop coupling, Cracker and cake machines, stripping device for, J. H. Mitchell, Crane, traveling, J. Murrey, Crutch, for, H. C. Behr, Cup, See Oil cup, Curbing and gutter, L. L. Landis, Curtain fixture, C. Gussel, Cuspidor lifter, G. S. Trumbore, Cut-off, C. W. Blake, Cut-out, for electric light, J. H. Chase, Cutter, See Buttonhole cutter, Cheese cutter, Corn cutter, Meat cutter, Cutting apparatus, E. J. Pullen, Darning last, C. H. Shaw, Dental pluggers, re-enforcing mallet for, J. L. Green, Detector bar clip, H. Johnson, Die, See Thimble die, Digger, See Potato digger, Directory, night, H. Bergstein, Disinfecting apparatus, F. J. Mitchell, Door check, G. H. Marillie, Door check, W. Winous, Door closer, C. A. Root, Door hanger, J. C. Wands, Drain trap, F. D. Crowner, Drainage, system of road, A. Mitchell, Drilling machine, S. E. Garbrant, Drilling machine, J. Ross, Dye, red, C. Dreyfus, Egg testing device, R. A. Galbraith, Electric conductors, attaching device for, E. T. Green, Electric conductor, conduit for, E. T. Greenfield, Electric light globes, guard for incandescent, J. Mino, Electric line hook, Locke & Lapp, Electric machine, dynamo, W. K. Freeman, Electric machine regulator, dynamo, W. K. Freeman, Electric motor, H. Groswith, Electric motor regulator, W. E. Hyer, Electric motors, operating, H. Groswith, Electric motors or dynamos, brush holder for, W. S. Patterson, Electric motor, K. E. Fisher, Electric wire coupling, W. E. Banta, Electric wires, underground conduit for, E. T. Greenfield, Electro-magnetic traction increasing system, M. W. Dewar, Electrode, secondary battery, Bradbury & Stone, Electrode, secondary battery, C. W. Kennedy, Electroplating, apparatus for, W. J. Possons, Electroplating carbons or other articles, apparatus for, W. J. Possons, Electrotype, W. B. Bapum, Elevator, R. Butterworth, Elevator, C. E. Torrance, Elevator safety device, Stean & Dyes, Embossing machine, S. Ross, Jr., Endless apron guide, H. E. Smith, Engine, See Compound engine, Gas engine, Steam engine, Engine, E. Field, Eophone, F. Della Torre, Evaporator and skimmer, J. H. B. Butts, Explorer's instrument, J. L. Simmons, Extractor, See Faucet extractor, Lemon juice extractor, Eyeglasses, nose guard for, W. Denkler, Eyeglasses, sliding guard for, L. Alexander, Farm gate, W. S. Day, Faucet extractor, R. D. Black, Faucet, for, C. B. Bosworth, Feed water to boilers, device for supplying, C. B. Bosworth, Fence, J. H. Hammer, Fence, H. A. Hollibaugh, Fertilizer distributor, W. A. Davis, Fire alarm, J. H. B. Butts, Fire extinguisher, A. L. Pitney, Fire extinguisher, automatic, J. Bishop, Fire extinguishing apparatus, J. E. Prunty, Flue cleaner, boiler, G. S. Smith, Fluid meter, C. N. Dutton, Gas engine, C. E. McClary, Frame, See Satchel frame, Fruit drying tray, Hammon & Sechrist, Fruit gatherer, A. A. Potter, Fruit gatherer, F. Stanke, Fuel feeder, pulverized, J. G. McAuley, Fuel feeding apparatus, J. G. McAuley, Fumigator, A. McClain, Furnace fuel feeding apparatus, W. S. Walker, Gauge, See Surface gauge, Water gauge, Galvanic battery, A. H. Hoy, Galvanic battery, C. G. De Peralta, Gas engine, rotary, G. H. Chappell, Gas pipes and fittings, apparatus for testing, Harrison & Sheard, Gas producer, J. W. Culmer, Gate, See Farm gate, Railway gate, Glazier's diamond, J. E. Lloyd, Governor, E. M. Moore, Governor, engine, R. M. Beck, Governor, steam engine, L. Anderson, Grain bin, J. Hawley & Barrett, Grain drill, J. T. Spicklemire, Grinding machine, G. E. Whitehead, Guard, See Mustache guard, Gun, T. J. Lovgrove, Gun, air, S. D. Engle, Gun, magazine, K. Krnka, Gun, straight-pull breech-loading, S. & K. Krnka, Halter, Wilson & Harvey, Hammer and lifter, J. Lindley, Hanger, See Door hanger, Tobacco hanger, Trolley wire hanger, Harrow, J. D. Cleek, Harrow and cutter, combined, T. L. Flanagan, Harrow, disk, H. S. Howard, Harrow, H. H. Moore, Harrow, spike tooth, D. C. Markham, Harvester, corn, C. H. Salzman, Harvester, cotton, G. N. Todd, Harvester, grain, H. C. Stone, Hats, receptacle or holder in, A. J. Parker, Heat preserving apparatus, A. A. Frey, Heat regulator, M. Curtis, Hedge trimmer, A. M. Fox,