

from a dealer in chemicals, dilute with five parts of hot water, mix thoroughly, and add excess of sulphuric acid. Filter off the silica, which will be precipitated, and wash with hot water.

(2452) S. J. R. asks how to harden talow in order that it may be used in lumps to rub on lumber and skids. Summary: We get tallow of a very inferior quality sometimes, which is soft and falls to pieces almost as if rotten. We wish to know how to cheaply restore it to the consistency of first-class tallow? A. Try melting it and mixing it with paraffine wax. This is the simplest method we can suggest, if not too expensive.

(2453) E. K. writes: I want to make a blackboard by covering heavy cardboard with some kind of slate preparation. Can you, through your paper, give me a good recipe for blackboard slating? A. Use a strong solution of shellac mixed with dry ivory black and ground pumice stone, and ultramarine blue. 1 gallon 95° alcohol, 1 pound shellac, 8 ounces black, 4 ounces blue, and 5 ounces ground pumice or fine emery is a good formula.

(2454) I. H. asks (1) for the formula for the preparation known as silicate for blackboards or a similar preparation. A. See preceding query. 2. Can you inform me as to what method I could adopt to prevent a safe lock being affected by the damp? Our lock becomes coated with verdigris, caused by dampness of safe door. A. We can only suggest having parts lacquered, or if they are exposed to friction in working, try vaseline as a lubricant. Even used as a coating it will keep off verdigris.

(2455) A. L. asks how to soften hard water without chemical. A. Some hard water is softened by boiling. If a sediment forms, decant the clear fluid.

(2456) F. W. S. asks at what degree Fah. the following metals fuse: Gold 1000° Fah., aluminum, silver, and brass. A. Gold, 2016° Fah. Silver, 1873° Fah. Aluminum, uncertain, and varying greatly with purity of metal, 1290° to 1560° Fah. Brass varies so in composition that no melting point can be given. It will vary from 800° to 2008° Fah.

(2457) G. H. B. asks: 1. What chemical or other solutions are there that have fireproofing qualities? (For instance, to saturate cloth or paper.) A. Tungstate of soda and phosphate of soda are excellent, especially the first. Even common salt has some power. 2. What wash or paint, that adheres well when exposed to weather, has fireproof properties? A. For rough work a wash made of cement and water might be recommended. For a roof paint consult our advertising columns. 3. What ingredients added to common white wash would greatly increase its adhering property? Iron oxide paint partly answers this, but I want a paint of stain for roof, preferably in green, that will hold, and I do not think the stains, now much used, are satisfactorily permanent, except in red. A friend showed me a number of barns built of rough hemlock boards. He made a thin glue sizing and gave them a wash of it, following immediately (when dry) with a coat of mineral (iron) paint. It gave the buildings a smooth finish, and paint lasted for years, and for that matter still lasts. I was surprised at its lasting quality and mentioned it to a house painter, he said it was a good and satisfactory way to treat such buildings. A. The government receipt for whitewash, already given in these columns, may be repeated: Slake 1/2 bushel of lime with boiling water, keeping it covered during the process, strain, and add 1 peck of salt dissolved in warm water, and 3 pounds rice flour boiled in water to a thin paste, 1/2 pound Spanish whiting, and 1 pound clear glue dissolved in warm water. Let it stand several days and apply hot. 4. Crude petroleum applied to wood has preservative qualities. Would green or other pigment added (for roof) give a permanent color? A. No pigment should be added to crude petroleum. 5. Could any ingredient be added to overcome the combustible nature of the petroleum? A. No.

(2458) G. M. C. asks: 1. Suppose dynamo and motor are seven miles apart. What per cent should the motor develop if 100 horse power is put into the dynamo? A. From 60 to 70 per cent. 2. What size of wire should be used to carry the current to the motor? A. It depends upon the current used. 3. Should the wire be insulated from the atmosphere? A. Preferably, but not necessarily. 4. Is it necessary that there be a return wire from the motor to the dynamo? Why not use the earth? A. A return wire is necessary on account of danger of grounding along the line through workmen or others. 5. About what is the resistance in ohms of motor described in SUPPLEMENT, No. 641? A. About 4 ohms. 6. About how many volts are necessary to run it successfully? A. An E. M. F. of 6 to 8 volts. 7. Would it make any difference if the field magnet of this motor was forged from soft iron? A. You can use either wrought or cast iron. 8. Why is it necessary that the resistance of the motor should be increased if a high resistance battery is used to drive it? A. The greatest amount of work can be realized when the resistance of the battery and external circuit are equal. 9. Should the battery cells be arranged in parallel or tandem? A. They should be connected in such a way as to secure the above E. M. F. and as large a current as necessary.

(2459) Jack asks: 1. The easiest and cheapest way to melt wrought or cast iron in small quantities, say up to 10 or 12 pounds, also lead. I have a small portable forge. A. Use a plumbago crucible, with a little borax as a flux. You will probably not succeed in melting such large quantities, and certainly not the wrought iron. 2. The cheapest way for me to take impressions or copies of letters that I write, and wish to keep a copy or duplicate of on file for reference? A. Use copying ink and a copying book and press. Simple hand copying appliances are sold by stationers to take the place of presses. 3. In splitting logs or other large timber for fence posts, wood, etc., can I not use powder or dynamite, instead of wedges and mauls? If powder, will common gunpowder do? A. Yes. Bore holes and use gunpowder, not dynamite. Tamp the powder with fine sand or brick dust. Bore inch holes and insert from two to four inches of pow-

der. 4. Are there steamboats in use that use naphtha for making steam? If so, please inform me about them. How it answers, what it costs, etc. A. For naphtha (crude petroleum) firing of boilers, see our SUPPLEMENT, No. 769. Light naphtha is generally to be considered unsafe.

(2460) C. C. asks: 1. What can I use to protect woods from dampness, and prevent warping in models made with it? A. Use only perfectly seasoned woods. Otherwise nothing will preserve the models. Shellac them with good orange shellac dissolved in alcohol. 2. What cement can I use to fasten together strips of cloth or leather on cloth, so as to stand washing in hot and cold water? A. Soak clear glue for ten hours in water enough to cover it, dissolve by heating, and add tannic acid until it is thick and rosy, apply at once with pressure. 3. Explain how electricity may kill when a heavily charged wire breaks and comes in contact with the human body. A. By grounding through the system. This implies, of course, the existence of a second ground or it may be of a series of minute grounds or leakages whose aggregate is enough to cause a strong current to pass through the body. In alternating or pulsating current systems there is also an inductive action like charging and discharging a Leyden jar which will shock without the formation of a second ground. Death by such a shock is very improbable. A second ground of some kind may generally be assumed.

(2461) F. P. C. writes: I noticed in the July 19 issue your request to amateur electrical workers. I will relate some of my electrical experiences. I made the simple electric motor according to the directions given in SUPPLEMENT, No. 641, and met with success. It developed about one man power. I used it for running fly fans, but the large battery required proved rather expensive. Later on I made a motor to run on the Thomson-Houston incandescent current. I used cast iron fields, and wound both fields and armature with No. 28. The armature heated badly on 110 volts, so I rewound the armature with 32; then it did not heat, but developed very little power. I used an armature like the one used in the simple electric motor. I think I would have had better success if I had used the Siemens armature. Later on I made an induction coil similar to the one described in SUPPLEMENT, No. 160. Instead of bare, I used covered wire, and wound each layer the full length on the coil, insulating each layer with one thickness of paraffined paper. After mounting it with condenser and all, I connected two cells of a large plunging bichromate battery. It gave about five-eighths inch sparks. I wound only one pound on the secondary coil. Afterward, hoping to obtain a larger spark, I used more battery. It gave a longer spark at first, then afterward it would give only one-fourth inch spark. I am afraid the extra battery burnt it out. I shall rewind it. A. You will find it advantageous to rewind your coil in two sections, as described in SUPPLEMENT, No. 160.

(2462) D. E. W. asks: 1. In Notes and Queries of a back paper you say the simple electric motor can be changed to a dynamo by shifting the commutator brushes on the other side. Please explain. A. It is necessary to shift the brushes on account of the change in the direction of the rotation of the commutator cylinder. In addition to this change, the field magnet should be made of soft cast iron. 2. Will it hurt the working capacity of the motor if I paint the Russia iron of the field magnet with asphaltum varnish? A. You can paint or varnish the parts referred to without detriment. 3. Would it be dangerous to attempt to stop the motor by taking hold of the pulley? Could it be stopped in this way? A. The principal danger would be of burning your fingers by the friction of the pulley. Of course there would be danger of injury by the current if the machine were placed in a lightning circuit. 4. What would be the lighting capacity, when run as a dynamo? A. Very small; probably 4 or 6 candle power. 5. Will the motor operate a 1 gallon ice cream freezer? A. With sufficient current it would. 6. Would it do to operate the motor by Brush arc light circuit? A. The E. M. F. is unnecessarily high; the machine is not designed for a current of that kind.

(2463) P. P. K. asks: Can I make the tubular shaft and the center (solid) one in the Wilmshurst induction machine, also the washer and nut to fasten the revolving plate with, of iron? A. Use well seasoned hard wood for your hubs. 2. Can I set the revolving plate three-eighths or one-half inch apart, as it is nearly impossible to get the plate set firm enough with nut one-sixteenth inch thick? A. You cannot expect good results without setting the plates near together. 3. How large should the brush sockets be, and how many? A. The brush sockets should be one-eighth or three-sixteenths diameter. Four are required. 4. How can I get window panes straight? Nearly every pane is a little curved and unfit for revolving plate. A. You can select flat panes of glass at any large establishment dealing in the article. 5. Will the machine work better if it is made air tight? A. If made air tight and kept dry within, its working will be improved. 6. Can I make the handle of the electrode of wood? A. Yes. 7. Is 22 turns per inch of 35 wire on the secondary coil of an induction coil enough? A. Yes. 8. Is the platinum contact on the spring necessary? A. Yes. 9. Can I use a soft iron rod instead of the wire bundle? A. No. A bundle of soft iron wire is required.

(2464) W. F. G. asks (1) if there is any method of electro-plating brass and iron with platinum. A. No successful method of electro-plating with platinum is known. 2. The best way to straighten pieces of iron wire about 2 inches long. A. The wire should be straightened in long lengths by means of the machine known as the wire straightener. Short pieces are sometimes straightened by rolling them between heavy flat plates of iron. 3. In boiling carbon plates in paraffine, steam arises and covers the whole plate with a thin film. Will this not interfere with the working of the battery? And if so, how can it best be prevented? A. Carbon plates should not be boiled in paraffine. The end only of the plate should be heated and filled by dipping into melted paraffine, or by rubbing a piece of paraffine over the heated portion of the plate.

(2465) W. J. H. says: Would you please tell me through the next number of your SCIENTIFIC

AMERICAN what is the thorough meaning of the astronomical term Milky Way and about what time this term came into use or whom it was first known to? I have been a subscriber to the SCIENTIFIC AMERICAN for nearly two years through a news dealer, and I consider it one of the finest scientific papers there are. A. The "Galaxy" or Milky Way is from γαλαξία a Greek word signifying milk, and was so named by the early Greek astronomers from its irregular milky whiteness, not then supposed to be stars, but of a cloudy substance. The Latins called it Via Lactea.

(2466) A. A. A. asks for a solution that felt may be dipped in, that will make it fireproof against flame and still be pliable and porous. A. Tungstate of soda is about the best fireproofing chemical. The trouble will be in adequately impregnating the felt with the solution.

(2467) J. L. D. writes: I have a drum two feet by three feet. How can I fill it with common illuminating gas, without the use of water in the drum, or without exhausting the air from the drum? A. Blow gas into and through it, the inlet pipe delivering it as near the top as possible. In a short time it will displace the air.

(2468) W. F. S. asks: 1. Can plaster of Paris be made hard by some mixture so it will not break easily and will not lose its color? A. Yes. Mix it with 3 to 10 per cent of powdered marsh mallow root. 2. Will you please tell me how to make some hard white cement? A. Use above mixture. 3. Can this be moulded in plaster of Paris moulds? A. Yes. 4. If so, what will prevent it from sticking to the moulds? A. Oil the interior surface of the mould.

(2469) W. F. B. asks (1) how to soften a rubber stamp that has grown hard. A. It cannot be done. 2. What to use to dilute hektograph ink that will not flow well. A. Use water or alcohol.

(2470) F. A. R. asks for a simple receipt for making furniture polish to clean old furniture. A. The simplest preparation is a mixture of 1 pint turpentine and 4 ounces finely scraped beeswax. A more complicated formula is: Beeswax 1/2 pound, linseed oil and spirits of turpentine each 1/2 gill. Either of these may be colored with alkanet root. For the latter, 1/4 ounce of the root should be melted up with the wax first. For the first, 1/2 ounce of the root may be added.

(2471) C. H. H. asks (1) how to destroy the musty smell which we have so frequently in brick houses. A. To destroy this odor, keep the house well ventilated, allow no trees to grow near it, in order that plenty of sunlight may fall upon the walls. 2. The best work on designs for farm barns. A. We recommend and can supply "Barn Plans and Outbuildings," \$1.50.

(2472) J. C. B. asks for a recipe for mildew-proofing awning. A. The following is the simplest. Dissolve separately 5 parts each of acetate of lead and of alum in sufficient water. Heat and mix warm. After standing pour off the clear solution, leaving the white residue of sulphate of lead, into 500 parts of water containing a little isinglass. Saturate the awning by soaking for 24 hours in this solution. Many other formulas are given.

(2473) L. J. E. asks for a formula for a finger nail polish. A. Use putty powder, true oxide of tin, perfumed with otto of lavender and colored pink with cochineal if desired.

(2474) G. L. S. asks: 1. How can the color in a meerschaum pipe be made to go to the top of the bowl? A. Use a second bowl placed on top of the regular bowl. This will color the upper edge. 2. Is there any particular method to follow in coloring a meerschaum? A. No; simply use it for smoking, and clean occasionally, as directed in query No. 2364. 3. Please give directions for making a small induction coil making spark enough to light one gas jet. A. Use a spark coil made by winding 3 or 4 pounds of insulated wire around a bundle of small iron wires, six inches long and an inch or so thick.

(2475) P. C. N. asks (1) how to treat horn so it will become soft and pliable. A. Immerse in hot water. 2. How to prevent buckskin from becoming hard by washing. A. The only treatment is to waterproof it. This may be done by working neat's foot oil and tallow into it by rubbing.

(2476) N. A. D. asks for an approved method for determining the air-dry weight of wood pulp such as is used in newspaper manufacture. A. Expose a weighed sample to the air, and weigh it until it reaches constant weight.

(2477) F. W. P. & F. E. E. ask: 1. What is a good liquid formula for cleansing and preserving the teeth and sweetening the breath? A. Any number of formulas can be given. The following is said to be very good: Carbonate of potash 1/2 ounce, honey 4 ounces, alcohol 2 ounces, water 10 ounces, flavor to suit with oil of rose and of wintergreen. 2. What is good to apply to the face after shaving, to keep it from getting sore or festering around the roots of the hair? A. Cyanide of potassium 6 grains, glycerine 1/2 ounce, strong camphor water 2 1/2 ounces, mix. This is poisonous and should be compounded by an apothecary. Only fresh cyanide of potassium should be used.

(2478) W. D. T. writes: I would like a receipt for cleaning straw hats. A. Brush over with soap and water; after washing off the soapsuds sponge with a weak solution of oxalic acid.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 23, 1890,

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

Table listing inventions with names and patent numbers. Includes entries like Accordion, Alarm, Aluminum, Anchor for buildings, Axle box, Axle machine, Axle skein, Balling press, Basket, wire and slat, Bed, folding, Bedstead, folding, Bee swarmer, Bell cord attachment, Belt, electric, Belt stretcher, Beverages, preparing carbonated, Bicycle, T. Thorp, Bicycle lock, Block, See Hat block, Blow tester, Coat-controlled, Boiler, See Steam boiler, Bolt, See Finger guard bolt, Bolt, G. S. Smith, Book backing machine, Book, combined receipt and record, Book, shipping receipt, Bottle filling device, Bottling apparatus, rotating, Box, See Axle box, Box with two compartments, Brake, See Locomotive driver brake, Brick and tile machines, die for, Brick press, rotating, Brush, commutator, C. Wirtz, Burner, See Gas burner, Hydrocarbon oil burner, Incandescent burner, Oil burner, Refuse burner, Burnisher, W. H. Boles, Butter, in mill device for determining the amount of, J. T. Riley, Button, A. J. Shipley, Cable grip, E. R. Guerra, Cable grip, traction, J. Hird, Calendar and memorandum pad, combined, J. T. Story, Camera, See Photographic camera, Can, See Shipping can, Can body making machine, Jordan & Hodson, Can cap, W. D. Brooks, Can cleaning machine, G. L. Merrill, Cans, machine for cleaning the tops of, G. L. Merrill, Cant hook, G. M. Ayers, Car construction, G. L. Harvey, Car coupling, J. D. Carr, Car coupling, J. Godsey, Car coupling, B. K. Hooks, Car coupling, N. Kramer, Car coupling, A. C. Martin, Car coupling, H. Sommerfeld, Car door, grip, H. Emery, Car seat, E. N. Gilliam, Car, sleeping, J. B. Davenport, Car wheel, J. A. Lacroix, Car wheel, J. Mullican, Card forming machinery, H. E. Cunningham, Carriage wheel iron, R. D. Jacobus, Carrier, See Coal carrier, Case, See Clock case, Chair, See Convertible chair, Rail chair, Railway chair, Chuck, car wheel, N. S. Bouton, Churn motor, W. Omer, Cigar power, W. Dickey, Clamp, See Spring clamp, Clock, alarm, A. M. Lane, Clock case, A. M. Lane, Clock key, A. M. Lane, Clock pendulum, G. P. Reed, Clock synchronizer, A. G. Wiseman, Clocks, duplex escapement for, C. B. Hibbard, Coal or rock drill, Wantling & Johnson, Coke and gas, apparatus for making, C. N. Trump, Collar, horse, C. A. Ludewig, Collar, for cuff, waterproof, J. W. Hyatt, Concentrator, C. E. Seymour, Convertible chair, Fant & Anderson, Contact device, electric, J. J. Hoppes, Cooking vessel, E. A. Peck, Cores, mould for forming, W. N. Reddout, Corn husker, J. S. Cuttell, Cotton gin, P. W. Chase, Counter-guard, G. C. Peck, Coupling, See Car coupling, Electric wire coupling, Crimping machine, J. G. Hodson, Crutch, G. W. Doe, Cuff holder, W. Wood, Cultivator, J. P. L'Homediou, Cultivator, gang, W. P. Sneepp, Cultivator shovel, C. A. Anderson, Cut-out, thermal, G. H. Whittingham, Cycle wheel, A. H. Overman, Cycle spindle, for timepiece, M. V. Bridge, Door check, W. Shipsey, Door securer, A. D. Norton, Drawings, producing line, L. O. Vincent, Drill, See Coal or rock drill, Drinking fountain, automatic, J. D. Houston, Dynamometer, regulator for, S. E. Nutting, Ecraseur, castration, Fergen & Macwhinnie, Elastic woven fabric, Green, Jr. & Sawyer, Electric conduit, underground, C. E. Loth, Electric heater, E. Abschaen, Electric light shade holder, L. J. Atwood, Electric machine or motor, dynamo, M. Mayer, Electric wire coupling, L. J. Jimpley, Electric wire coupling, F. R. Jones, Electrical apparatus, impregnating parts of, F. L. Rawson, Engine, See Explosive engine, Gas engine, Hoisting engine, Rotary engine, Rotary steam engine, Steam engine, Traction engine, Engine, A. J. Bates, Engraving machines, turning point attachment for, A. E. Francis, Eraser, G. F. Deuelor, Eraser, blackboard, H. E. Gardiner, Eraser, slate, S. S. Sloan, Explosive engine, J. W. Eisenhuth, Explosives, manufacture of, H. S. Maxim, Eyeglass holder, J. H. Knowles, Eyeglasses, J. King, Eyeglasses, Emond & Bishop, Fabric, See Elastic woven fabric, Wire fabric, Fare register, J. I. Rose, Feed water, heating, C. H. Uhler, Fence, M. T. Swopes, Fence post, A. Peterson, Fence post, E. Sims, Jr., Fence posts, wire fastener for, W. Helfenberger, Fence stay, wire, M. S. Tarkington, Fence, wire, E. Sims, Fiber cleaning and polishing machine, vegetable, W. F. Alcomer, File, paper, J. H. Ais, Finger guard bolt, D. Woehrlie, Fire alarm, J. H. Earles, Fire alarm, portable electric, Upton & Dibble, Fire escape, J. D. Carr, Fire escape, R. Mann, Freight apparatus for handling coal, ore, or other, R. Thew, Fuel, artificial, W. B. McClure, Fuel, manufacturing artificial, W. B. McClure, Furnace charging and discharging apparatus, M. P. Higgins, Furnace lining apparatus for repairing, G. W. Goetz, Gauge, See Ring gauge, Spectacle gauge, Game apparatus, W. C. Kantner, Game counter, S. B. Jenkins, Game counter, S. Stieglitz, Garment supplier, W. H. Dumb, Gas, apparatus for making hydrogen, J. W. Tallmadge, Gas, apparatus for the manufacture of oil, D. E. Teal, Gas burner, coal, G. Beck, Gas burner, C. W. Gibbs, Gas generators, stand pipe for ammonia, Poaching & Vogt, Gas lighter and extinguisher, automatic, N. Newmad, Gas machine, J. S. Wood.

