

well with clean hot water and a stiff brush. A thick solution of silicate of soda (water glass) is said to answer better than lime and sal soda—it may be mixed with a little slaked lime, kaolin or whiting.

What causes the noise from a heavy cart wheel in motion on stone pavement? And why is the noise greater when the cart is heavily loaded? A. It is caused by the dropping of the wheels from the tops of the paving stones into the depressions between them. The force of the blow increases with the weight of the wagon.

(32) S. T. L. asks for a recipe for making rubber cement. A. Digest caoutchouc cut in fine shreds with about 4 volumes of naphtha, in a well covered vessel for several days. Naphtha should not be used indoors.

(33) H. E. H. asks (1) how to make a good cheap bottle wax. A. Resin, 6½ parts; beeswax, ¾ part; Venetian red or red lead, 1½ lb. 2. Shellac, 3 parts; Venice turpentine, 1¼ part; vermilion, 2¼ parts, or Venetian red or red lead, q. s. 3. Resin, 6 parts; shellac and Venice turpentine, each 2 parts; coloring matters to suit. The bubbling is due to overheating the wax, moisture in the stopper, or both. It is often advantageous to slightly oil the stopper.

(34) G. H. A. asks: What will prevent the accumulation of dandruff? A. See p. 27 (1), and 188 (43), SCIENTIFIC AMERICAN, vol. 38.

(35) A. O. K. asks for a recipe for making a good white ink, such as is used on the sample card inclosed. A. Mix pure, freshly precipitated barium sulphate with water containing enough gum arabic to prevent immediate settling of the substance. Starch or magnesium carbonate may be used in a similar manner—they must be reduced to impalpable powders.

1. Is there any danger attending the use of petroleum for removing scale in boilers? A. If the quantity introduced is small no danger need be apprehended. 2. Which gives the best results, the crude or the refined article? A. The latter is generally used.

(36) G. B. F. asks: By what process is the blacklettering done upon saw blades? For instance, Diston's card on the Centennial saw; it is evidently printed and etched, as they are all alike, which would not be the case if drawn by hand through a waxed surface. A. Stencils are employed, we believe. Use in etching pyrogallic or dilute nitric acid or aqueous iodine solution.

(37) L. B. & Co. write: In making auto-plates it is necessary for us to use a battery, and we would like you to inform us which of the many that are for sale is the best for our purpose, and how many cells we will have to use to deposit an ¼ of an inch of copper over say 10 to 15 square feet of surface, in a tank measuring 2 x 2 x 3 feet, in the shortest possible time. A. The Smee cell with carbon negative plates is, we believe, generally preferred; but for work of this kind a magneto-electric machine is better than batteries. The power (number of cells) required is estimated in battery zinc surface about equal to the surface of the work exposed in the plating bath. It would require many hours to deposit a shell of the thickness you mention.

(38) J. A. S. asks: 1. Can nitrous oxide gas be made by heating nitrate of ammonia in a flask, and is there any danger of an explosion? A. If no carbonaceous or combustible matters are present, there is no danger. 2. Is oxygen explosive alone or mixed with air? A. No.

(39) D. R. writes: No. 20, vol. 38, contains an article on "How to make a strong Electro-Magnet." Desiring such to ring an 8 inch bell, I followed the instructions given, wrapping the iron pipe with three layers of insulated wire (inclosed sample), and attached the ends to a battery of 7 cells (disk) Leclanche in good working order. The results were not satisfactory, the magnet showing very little power, not sufficient to move the clapper rapidly. Can you explain the difficulty? Is the wire too large and the layers insufficient? A. The wire is too heavily covered with cotton. For the purpose named we think a magnet of the ordinary form would be better than the one you describe.

(40) A. W. C. asks: What substances can I dissolve in alcohol, that the flame will be blue when burned in a spirit lamp, and also the ingredients for producing a red flame in the same manner? A. We know of nothing soluble capable of producing very satisfactory flame colorations of these orders. For red you may try a little strontium nitrate, and for blue bismuth nitrate or indium chloride.

(41) W. H. E. W. writes: I am using water from a driven well, iron pipe and pump; the water is strongly impregnated with iron; is it injurious to my health? A. If the quantity of iron is excessive, yes.

(42) F. D. W. asks for a recipe for bleaching white holly which has turned yellow by age. A. You may try a strong aqueous solution of sodium sulphate, also solution of calcium hypochlorite (bleaching powder).

(43) E. A. F. asks: 1. What is the composition of the explosive called "white gunpowder"? A. Potassium ferrocyanide (yellow prussiate), 28 parts; loaf sugar, 23; potassium chlorate, 49. 2. I understand that it is easily manufactured, and that its projectile force is much greater than gunpowder. Why is it not more used? A. The principal reasons are that the manufacture of this powder is very expensive, and that, as the powder acts very strongly upon iron and steel during ignition, it can only safely be used in bronze ordnance and in the filling of shells.

(44) J. H. M. asks how to mix a gold solution for battery gilding for copper alloys, one that will work well in cold weather. A. Dissolve 12 ozs. of potassium cyanide in a gallon of water, and in this dissolve ½ oz. of oxide of gold.

(45) B. M. A. and C. P. K.—The simple electric light apparatus is not in the market. See SCIENTIFIC AMERICAN SUPPLEMENT of November 9 for a description of the apparatus which will enable you to make it.

(46) E. A. D. asks: What chemicals will remove ink blots from paper, when dry? A. Try a

strong solution of bleaching powder in cold water or acetic acid, also strougaqueous solution of oxalic acid. Will the use of goggles injure the eyes in any way? A. We do not think that goggles having smoke colored glasses would injure the eyes.

(47) W. L. I. writes: Will you please tell me the different parts of speech of the different "thats" in the following verse?

"For it is known that we may safely write,  
Or say, that that that that that man writ was right;  
Nay, e'en, that that that that that that followed  
1 2 3 1 2 3  
Thro' six repeats the grammar rule has hallow'd;  
And that that that that that that that began  
1 2 3 1 2 3  
Repeated seven times is right. Deny it who can."

A. 1. Relative pronoun. 2. Definitive adjective. 3. Noun. 4. Not justifiable.

(48) P. W. J. should repeat his questions, giving full name and address.

(49) J. F. F. asks: Has compressed air ever taken the place of steam, and if so, to what extent? Can it ever be used for motive power on railroads? A. It is largely used in tunneling operations, and has been used on railroads as you suggest.

If the perpetual motion could be made, would it be of any use? A. Yes.

I have an oxycalcium stereopticon; can I use an electric light as a substitute. If so, please give me information for obtaining an electric apparatus. A. Yes. Insert a notice in the "Business and Personal" column if you do not find what you want among the advertisements.

(50) C. B. P. writes: I have two cylinders 2½ x 5 in., which I should like to make use of to run a small yacht. What would be the most advantageous size, as regards largest possible dimensions and quickness of speed for my boat? Provided my boiler be of copper, how and of what shape should it be made, and of what thickness, to insure minimum space and weight? What lap and lead ought the valve to have, and what diameter and pitch the screw? A. With a boat 28 feet long, screw 30 inches diameter, 3 feet pitch, vertical boiler with 100 square feet of heating surface, engine ¼ inch lead, cut-off ¾ stroke, you might expect a speed of 7 to 8 miles an hour in smooth water.

Are any magazines or papers published in Australia or New Zealand devoted to the interests of mechanical engineering? Would you give me the names and addresses of the best? A. Perhaps some of our friends in these localities will send the information desired.

(51) R. D. B. writes: I have all the parts of a Grove galvanic battery except the porous cups. How can I make them, or is there anything I can use as a substitute for them? A. Porous cups cannot be easily made except by potters. Use an unglazed flower pot.

(52) A. K. S. writes: I wish to ascertain the exact horse power of an engine 30 inches bore, 36 inches stroke, running 75 revolutions per minute under a boiler pressure of 80 lbs. steam; the engine stands about 40 feet from steam dome, or, in other words, there is 40 feet of steam pipe. I want the exact horse power of that engine, there are so many different opinions. A. It cannot be calculated unless the mean pressure acting on the piston during each stroke is known, and this can only be determined by experiment.

(53) F. W. M. asks how much carbonic acid gas can be made from 1 pound or 1 quart marble chips; also what proportion of sulphuric acid to use. A. If the marble is reasonably pure, about 30 cubic feet. Marble + sulphuric acid (specific gravity 1.8) =  
100 96  
calcium sulphate + water + carbonic acid. Under nor-  
136 18 44.

mal conditions of atmospheric pressure and temperature a cubic foot of carbonic acid weighs about 1.8 oz. The amount of oil of vitriol to be used in practice is somewhat greater than that above indicated. It should of course be diluted with water.

(54) D. I. C. writes: I am between the age of forty-nine and fifty, somewhat past the time when men generally begin to lose their sight, and mine is beginning to fail. I am naturally nearsighted, my ordinary distance for reading being about eight inches; but now if I hold small print, say Webster's pocket dictionary, that close, the letters become blurred and run together, and the closer to the eye the worse blurred; but if when blurred the worst and most indistinct I close the eyelids one half or more, I find the letters to appear sharp and clear. Can this be explained? A. Closing the lids of the eyes tends to flatten the crystalline lens, and by this means to focus the eyes on the object. It may also help to make the image sharper by shutting out side lights.

(55) G. E. H. asks: How can I cut out circular pieces of looking glass about ¼ of an inch in diameter; I am not particular about the thickness, but the surface of the glass must be perfectly plane, as the least convexity or concavity would mar its application, and the reflecting substance—whatever it might be—should not be defaced. A. Very thin glass, like microscope slide covers, may be cut with a diamond. Thick pieces of the diameter given could not well be cut in this way. You might do it with an iron or copper tube having ¼ inch internal diameter rotated rapidly and supplied with emery and water. It would probably be best to silver the disks after they are cut.

(56) J. G. asks: Am I right in saying that the first elevated railroad car was driven by a stationary engine with wire rope attached? A. Yes.

(57) R. W. S. asks: 1. Will you please inform me whether frost has any effect upon spiral springs which are in use in cold weather out of doors? A. They sometimes become more brittle. 2. What is the best material for spiral springs for hard usage? A. Spring steel.

(58) H. T. W. writes: In an article published recently, headed "New Industrial Enterprises," the question is asked: "Is it not practicable to teach our farmers that they may produce all the flax fiber as fast as required?" I am much interested in the question, and wish to know how to obtain statistics as to the

trade as far as this country is concerned. That is, the quantity manufactured, imported, and grown, and the parts of the country in which the larger quantity is raised, prices, etc. Also in relation to the seed for oil purposes, whether it is mostly imported, from where, and in fact everything in connection with the industry, with a view to getting at the desirability of engaging in it. A. See article on the subject, p. 400, vol. 38, SCIENTIFIC AMERICAN. There are several books on the cultivation and treatment of flax in print. Address booksellers who advertise in these columns. For statistics consult the reports of the Bureau of Statistics and of the Department of Agriculture.

(59) S. J. M. asks: 1. At what depth is the minimum of temperature reached? In other words, how far below the surface of the earth does the heat of the sun penetrate? A. It varies in different parts of the globe; at Paris it is about 30 yards. 2. Would an extra thick arch over a cellar diminish the temperature at its bottom more than a simple covering to keep out the sunlight, etc.? A. Yes.

(60) L. H. I.—See "Rights of Investigators," p. 128, current volume. SCIENTIFIC AMERICAN SUPPLEMENT, No. 133, contains full directions for making a phonograph.

(61) E. B. B. asks: Will you please give the process for making rubber stamps for printing, from the making of the mould to the finishing of the stamp? A. You will find an article on this subject on p. 1326, SCIENTIFIC AMERICAN SUPPLEMENT. See also p. 204 (33), current volume, SCIENTIFIC AMERICAN.

(62) L. W. F. asks: What substance can I cast readily in moulds that will possess the flexibility and hardness of India rubber upon cooling? A. The following composition is very flexible, resembles caoutchouc somewhat, and may be readily fused and cast. Glue is melted in water by the aid of a hot water bath into a very thick paste, to which glycerin is added in about the same quantity as that of the dry glue. The mixture is then thoroughly stirred and further heated to evaporate the excess of water. Sawdust, pigments, metallic oxides, earths, etc., may be added to color, toughen or harden the substance.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J. P.—If properly burned and ground the substance might be used with oil as a cheap paint, and to a limited extent by paper makers.—H. H. C.—No. 1 (black) is an indurated clay containing much finely divided carbon. If properly ground it might be useful as a substitute for lampblack in some cheap paints, etc. No. 2 (red), is an earth consisting largely of an iron sesquioxide, various grades of which are known in the market under the names of red earth or ocher, burnt ocher, Indian red, Berlin red, English red, Armenian bole, terra di sienna, etc., and much used in paints.—D. L. B.—It is marcasite—sulphide of iron, of little value.—J. S. R.—Quartz.—A. M. K.—It is celestite inclosing sulphur.—D. R.—The smaller fragments are magnesium limestone or dolomite. You should send larger samples.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:  
Wooden Buildings. By D. F. H.  
Lenses. By C. A. C.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Many of our correspondents make inquiries which cannot properly be answered in these columns. Such inquiries, if signed by initials only, are liable to be cast into the waste basket.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

September 10, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, 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.

Table listing various inventions and their patent numbers, including items like Air compressor, Anodes, Anti-attrition compound, Aplary or bee house, Atomizer, Bag and sack, Bag fastener, Baggage check, Bale band tightener and band, Barrel combination, Bars, colling metal, Bed bottom, Bed bottom spring, Bedstead and fire escape, Bedstead fastening, Bedstead, wardrobe, Belt coupling, Bevel, Bit stock, Blank forming machines, Book binding, Bottle stopper and fastener, Box, express, Brake, car, Brake, wagon, Brick kiln, Broom, J. Arbetter, Brush, blacking, Brushes, manufacture of, Buckle, bale tie, Bullion, refining base, Button fastener, Button polishing machine, Calculating machine, Can, liquid, Car berths, arm for sleeping, Car coupling, Car coupling, Van Hoeseen & Brown (r), Car coupling, Webb & Tinker, Car coupling tool, Car door fastening, freight, W. Engles, Carbonizing apparatus, beverage, B. Bates, Carbureter, T. Miner, Carbureting apparatus, L. H. Reid, Carriage top standard, E. Betz, Cartridge loading mechanism, R. H. Dalzell, Cattle guard, Hallner & Lindquist, Chair, dental, H. C. Tripp, Chair, rocking, J. F. Schulte, Chill for car wheels, J. A. Barr, Chuck, M. McAnly, Churn, W. F. Baird, Churn dasher, W. B. Mumbrue, Cigar cap, J. T. Emerick, Cloth shearing machine, rest for, E. Woolson, Coffee pot, J. M. Davis, Combs, rounding the ends of, W. Booth, Condenser, siphon, G. H. Starbuck, Cooking apparatus, steam, L. I. Ayer, Corkcutting machine, J. C. Tennent, Culinary utensil, A. F. McConnell, Cultivator, J. C. Boyd (r), Cultivator, W. Henigst, Curtain roller and bracket, E. T. Hingham, Curtain roller and bracket, P. W. Phillips (r), Dental drill, W. M. Reynolds (r), Dock, Bell & Costello, Drilling machine, rock, A. J. Mershon, Earring cover, A. Hessels, Elevator, ice, R. G. Brown, Elevator, water, A. B. Davis, Engine and pump, steam, J. G. Baker, Engine, rotary, J. Jardine, Fabrics, measuring and marking, S. C. Talcott, Faucet, H. Alexander, Faucet and cock, R. F. Gillin, Fence wire, barbed, K. Tyedal, File, bill and letter, T. Orton, File holder, R. Hudson, Fire escape, W. Duryea, Fish drier, D. H. Tetu, Flooring, portable parquetry, A. Slemroth, Fluting machine, C. A. Sterling (r), Fork, horse hay, L. Frank, Fruit picker, G. Shelton, Furnace, ore roasting, D. J. O'Harra, Furnace, reverberating, W. Mann, Gauge and glass tube cutter, steady, W. Heyn, Game table, G. L. Wittell, Gas generating burner, Stead & Bayley, Gas regulator, F. B. Vail, Gate hanger, J. S. Smith, Gate, sluice and flood, B. C. Downs, Glass, process for annealing, A. Weyer, Governor for horse powers, J. D. Reiff, Governor, steam engine, Moore & Scott, Grain binder, Ross & Parker, Grain binder, C. Van Houten, Grain separator, J. F. Becker, Grain separator, R. B. Robertson, Hame, J. J. Carpenter, Harness, D. K. Wertman, Harvester, corn, C. E. Conner, Hedge trimmer, J. A. Stephenson, Herrings, packing, G. T. Peters, Hook, F. Kortick, Horse detacher, W. G. Cummins, Horse power, P. Beche, Horseshoe, A. W. Smith, Jacket, measuring, H. Lingen, Jewelry base, design for, a Keller & Frey (r), Lamps, etc., lighter and extinguisher, S. C. Swett, Latch, gate, E. S. Shellhouse, Lathe, screw cutting, A. F. Cherry, Leather dressing machine, A. J. Alexander, Lifting jack, J. Buel, Lifting jack, W. Kniffin, Lifting jack, J. B. Smith, Lubricator, vehicle axle, Wayland & Berry, Mailing package, H. G. Pearson, Medical compound, W. M. Green, Milk, separating cream from, P. Shaw, Motor, hydraulic, W. B. Cass, Necktie fastener, A. M. Smith, Nut cracker, C. F. Ritchel, Ore separator, E. B. Hastings, Ore separator, T. S. Lewis, Ore washer and amalgamator, Hobart & Best, Organ, reed, H. W. Smith, Organ valve, reed, H. W. Smith, Packing for pistons, etc., Horton & Brady, Packing, piston rod, E. T. Prindle (r), Paper box, H. A. Mann, Jr., Paper feeding machine, S. Harlow, Paper sizer and varnisher, R. McNamee (r), Patterns, tool for cutting out, D. F. Hartford, Peg float, A. Whittemore, Pencil, draughting, F. W. McGee, Pianoforte action, upright, C. F. Chew, Pianoforte frame, upright, C. F. Chew, Pipes, etc., from rubber, etc., H. J. Merrens, Pitcher, ice, T. C. Smith, Pitchers, etc., cover for, L. Selling, Plaiting machine, M. Bradley, Plow, H. J. Gentzsch, Sr., Plow, F. K. Jennings, Plow, W. G. Reid, Plow, S. F. Wadleigh et al., Plow, ditching, Stuart & Allen, Pocket book frame, Read & Prahar (r), Press, ballug, W. D. Riddick, Press, broom, D. Bard, Press, cotton, J. D. Stanley, Printing machine inker, C. H. Bacon, Pump, W. H. Peterson, Pump, J. S. Putnam, Pump, detritus, E. Moreau, Pumps, walking beams of oil, W. B. Tracy, Punch, ticket, W. H. Pickford, Rake, horse hay, Laraway & King, Rake, horse hay, W. M. Saunders, Rake, horse hay, G. R. Williams, Range, cooking, D. H. Thomas