

tine as a lubricant. Or use a flat-ended copper drill supplied with coarse emery and water.

(42) E. A. D. P. says: I have heard it asserted that south of the equator the magnetic needle points to the south instead of the north. Is it true, and if so what is the cause? A. The statement is not correct. Local causes sometimes affect the needle so as to invert its polarity.

(43) R. G. B. asks how to clean a brass chandelier that is badly fly specked, so as to restore it to its former color? A. The treatment must depend somewhat upon the nature of the lacquer. Try a little fine rottenstone, slightly moistened and applied gently on a piece of chamois skin; or, if the lacquer will bear it, use warm water and the yolk of an egg.

(44) J. M. B. asks: What is the process of making dies in steel by sinking metal, softer than the steel hub, into the die? Is the process patented? A. No. See "How Greenbacks are Made," in Nos. 14 and 15 SCIENTIFIC AMERICAN, vol. 27, 1872.

(45) G. E. S. writes: 1. I wish to lift a weight of 2 ozs. 1 inch high, once in every second; what size electro-magnet, and what size and length of wire do I require? A. Use a piece of soft half inch round iron, nine inches long, bent in the U form for the core, and 600 feet of No. 30 copper wire, cotton covered, for the spools; arrange your armature on a lever, with the 2 oz. weight at one end, so that the armature need only move a short distance to do the work. 2. What kind of battery would you recommend for working this for several months without attention? A. Use ten cups of gravity battery, which may consist of a disk of zinc and one of copper placed over, and parallel with each other, in a glass jar; the copper being imbedded in about 1 lb. of sulphate of copper in crystals placed at the bottom of the jar; the zinc is suspended about 4 inches above. The battery is set in action by pouring in a solution of sulphate of zinc, until the zinc is covered: the copper of one cup is connected with the zinc of the next, by means of a "kerite" or gutta percha insulated wire running through the solution and riveted to the copper disk.

(46) W. D. B. asks: Which is the heavier, 1 cubic yard of the air that we breathe on a damp and cloudy day, or the same quantity of the same air on a dry hot day? A. Air saturated with moisture is specifically heavier than dry air at a like temperature; but the total atmospheric or barometric pressure in a given locality is usually less in wet than in dry weather, the temperature being the same.

(47) D. K. says: I require for the benefit of my work a temperature of 75°, average temperature for the three winter months. I have to make 30° artificial heat, and it costs \$100. Suppose I am in a locality where the average temperature for those three months is 30° and have to make 45° artificial heat, how much more will it cost, other things being equal? A. This would depend much upon the arrangement and perfection of the heat radiators, and the character and tightness of the walls, etc. Probably a third more fuel would suffice.

(48) F. D. G. asks for a filling for a rice hulling stone that has been broken? A. Use pulverized stone and a strong solution of alum in water.

(49) J. A. J. desires to know what causes it to rain immediately after every large battle? A. The concussions of the explosions are supposed to cause the clouds to gather. The theory is very vague.

(50) C. C. asks: What is the fastest rate of speed attained by fast trains on American and English railroads? A. About 60 miles an hour. How can I expand or diminish the size diametrically of a small brass tubing? A. By drawing.

(51) J. H. B. asks: What will prevent iron hoops on barrels from rusting? The barrels are stored in a very damp cellar. A. Cover the hoops with a thick coat of good paint or asphaltum varnish.

(52) J. S. F. asks: Can anthracite coal dust be used as fuel under a bituminous coal burning boiler by introducing a series of steam jets under the furnace bars? A. Yes, but it may be necessary to change the grate bars.

(53) H. A. L. asks: 1. Can water be compressed? A. The compressibility of water is found to be 1/100,000th of its bulk for each atmosphere (=about 15 lbs. per square inch) of pressure. 2. How or in what way? A. Usually in strong vessels of glass by powerful screw pressure exerted on a piston of soft metal. A suitable glass flask with the neck drawn out into a fine tube is completely filled with hot water (pure distilled) and a little globule of mercury worked into the tube to indicate by its movements the change of volume of the water within. The flask is placed in the strong vessel referred to, surrounded by water, to prevent change in volume of the flask, and the pressure applied. The fall of the mercury globule indicates the compression of the water.

(54) I. B. K. asks if a flywheel resting in two balances and revolving, would the balances show any increase of weight? A. No.

(55) E. D. asks how to make an ink for postal cards, which will be colorless until heated? A. Sulphate of copper and sal ammoniac, mixed in equal parts, will become yellow if exposed to the fire. A weak solution of chloride of cobalt and chloride of nickel is turned to a green by heat. A solution of acetate of cobalt, with a little nitrate added to it, turns to a rose color by heat, and disappears when cold. The others are more or less indelible when once developed.

(56) D. A. asks how to enlarge or reduce a drawing from a square to a parallelogram of any given proportions? A. You can change the relative proportions by dividing the original design into small squares and transferring the parts contained in these squares to those of the desired forms, and vice versa.

(57) W. S. W. says: We have two boilers connected at bottom by a mud drum with six inch openings. At the top by a steam drum with openings the same. We want to work them with separate fires,

where at times steam will be made faster in one than in the other. Will there be any difficulty in keeping the supply of water equal? A. Probably not.

(58) J. E. L. asks: Will I be obliged to take a license out to fire a boiler in New York city that does nowork but furnish steam to pump water to the top of a hotel? A. Yes.

(59) J. W. H. asks where to cramp an exhaust on a high pressure engine to make it sound loud? A. At the end of the exhaust pipe.

(60) F. D. W. asks: What are the so-called seven wonders of the world? A. 1. The Pyramids of Egypt. 2. The Mausoleum, built by Artemisia, wife of Mausolus, king of Caria. 3. The Temple of Diana at Ephesus. 4. The Walls and Hanging Gardens of Babylon. 5. The Colossus of Rhodes. 6. The Statue of Jupiter Olympus. 7. The Pharos or Watch Tower built by Ptolemy.

(61) B. D. W. asks for the rule for increasing or diminishing the speed of machinery by shafting and pulley? A. See No. 12, p. 181, current volume. Is corn meal kiln-dried before or after it is ground? A. After.

(62) D. F. H. asks: In a steam boiler, where is the steam made? A. It is made at the heating surface.

(63) G. W. asks: 1. What kind of oil is used for tempering steel? A. Lard oil. 2. Can a circular saw be tempered without springing it? A. No. After being tempered, saws are put in proper shape by hammering.

(64) H. & C. ask how to prevent scale in steam boilers? A. Preventives depend upon the quality of the feed water. The use of heaters to precipitate solid impurities is recommended.

(65) W. McC. asks how to fix the warp in a hand loom for weaving? A. You will find information in Gilroy's "Art of Weaving."

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

E. P. S.—The powder contains silicate of alumina, lime, and magnesia carbonates, sesquioxide of iron, sand, traces of alkalies, and films of mica. It is probably the washings of felspathic and limestone rocks. It is not valuable.—L. T. S.—They are, for the most part, impure clays. Nos. 1 and 4 might be used for brick-making. They contain considerable quantities of sesquioxide of iron, lime, and silica (impurities). No. 2 is aluminite—a hydrous sulphate of alumina—mixed with a little clay, sand, and gypsum. It might possibly be used in alum making. No. 3, after washing, will answer for white table ware and pottery in general.—H. S. S. C.—The bright particles and the rock are mostly of iron sulphide—marcasite. It contains a trace of silver and probably a little gold.—Mineral from —, Derry, N. H. It is a variety of fluor spar—fluoride of calcium.—G. G.—No. 1 contains chalcocopyrite—sulphide of copper—altered marcasite, and a trace of nickel. It probably contains enough copper to be of value as an ore of that metal. No. 3, quartzose with pyrites. No. 5, quartz containing hornblende, mica, and limonite. No. 6 is mica schist with limonite. No. 7 is talco-schist. No. 8 is specular iron ore. Nos. 2 and 4 are missing.—R. A. W.—They are crystals of tourmaline imbedded in quartz rock.—E. N. C.—It is a variety of pipe clay richly colored by sesquioxide of iron. It may be used for pipes, tiles, common pottery, bricks, etc.—I. M. P.—It is marcasite—composed of sulphur and iron.—J. W. F.—The packages should have been labeled; we cannot identify them.—J. F. S.—It is a limestone containing a large percentage of silica; the bright metallic particles consist of iron pyrites—see p. 7, vol. 36, of the SCIENTIFIC AMERICAN. The percentage of alumina is somewhat large.—N. L. L.—It is a clayey deposit showing considerable potash. An opinion of the value of a soil is dependent upon the results of a chemical analysis.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Sea in Sahara. By M. M.
On Locomotive Wheel Sliding. By J. F. A.
On Domestic Water Supply in the Country. By P. A. S.
On the Tides. By W. H.
On How to File the Scientific. By G. H. B.
On Patent Medicines and Secret Remedies. By V. N.
On the Congo River. By W. M. R.
On Anthrax-Epizooty. By J. S.
On the Red and the Two-lined Salamander. By C. F. S.
Also inquiries and answers from the following:
S. C.—J. D. P.—F. C. S.—I. S.—A. G. S.—A. S. P.—H. M.—G. W. G.—L. H. M.—J. G. J.—S. O. & Bro.—R. M., Jr.—A. M.

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.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who makes steam pumps to be applied to sailing vessels? Who makes and sells dynamite powder?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

OFFICIAL.

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending September 18, 1877, 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 inventions with names and dates, such as: Adding machine, W. L. Hofer. 195,281; Addressing machine, A. Dick. 195,209; Auger, earth, J. Fisher. 195,356; Awning and shutter, W. A. Hoyt. 195,285; Bale band tightener, J. C. Hodges, Jr. 195,230; Barrel cover, Sheldon & Dunscomb. 195,310; Barrels, etc., handle for rolling, C. O. Dodge. 195,210; Bath tub, W. J. Patton. 195,388; Bedstead, W. Hendley. 195,363; Bedstead, S. Burr (r). 7,892; Bedsteads, headboard for, W. W. Lummus. 195,296; Bee hive, I. B. Burroughs. 195,577; Bee hive, J. F. Van Horn. 195,422; Bell-ringing device, E. Perry. 195,391; Binder for invoices, W. P. Bissell (r). 195,385; Binder, temporary, J. W. Munday. 195,226; Bit brace, W. A. Ives. 195,373; Boot and shoe, G. C. Steinhauer. 195,414; Boot and shoe tip, S. Prior. 195,398; Brick machine, H. Lindsey. 195,378; Buckle, harness, A. L. McQuary. 195,299; Can, milk, Albaum & Eisenla. 195,243; Can shield, shipping, E. T. Mason. 195,380; Canister, E. Norton. 195,301; Car brakes, E. O. Richard. 195,400; Car coupling, H. M. Grover. 195,360; Car coupling, J. R. Lamb. 195,290; Car doors, register for freight, W. H. Hoyt. 195,284; Car roof, E. U. Benedict. 195,254; Car spring, J. Barr. 195,357; Carpet beater, M. H. Foster. 195,357; Caster, furniture, C. Horn. 195,232; Cattle-watering device, W. H. Hayes. 195,274; Chair and cradle, H. J. Beaudet. 195,333; Chair, C. G. Pease. 195,390; Chair, E. S. Pratt. 195,396; Chair, W. D. Pope. 195,395; Channeling machine, G. W. Bacon. 195,250; Charm, C. A. Atkinson. 195,324; Chart, school, C. Corning. 195,348; Chimney, P. Mihan. 195,382; Chimney top, W. Quayle. 195,399; Churn, A. P. Minnick. 195,224; Churn motor, W. W. Hinkle. 195,368; Cigar tip former, J. Schalscha. 195,405; Clothes drying rack, W. C. Alken. 195,202; Coffee roaster, J. H. Bankston. 195,251; Coffin, J. A. Hogue. 195,369; Coffin handle, C. A. Bailey. 195,325; Cooling or disinfecting rooms, B. W. James. 195,374; Copying press, M. V. Z. Woodhull. 195,429; Corset, T. F. Hamilton. 195,271; Crowbar, Spurr & Upton. 195,412; Currycomb, J. F. Clune. 195,344; Desk and table, C. Blake. 195,433; Ditching and excavating machine, S. A. De Force. 195,263; Door, hatchway, R. Heneage. 195,276; Door spring, F. Ziesenis. 195,242; Dredging tube, W. P. Lewis. 195,298; Elevators, balance for, H. R. Plimpton. 195,305; Engine valve, W. H. Harrison. 195,361; Envelopes, machine for opening, A. B. See. 195,407; Evaporating pan, H. W. Hescoek. 195,366; Exercising machine, L. L. Atwater. 195,247; Eyelet hooks, J. Charlton. 195,341; Fat, purifying raw animal, I. Mayer. 195,297; Faucet, C. C. Clapp. 195,342; Faucet, W. S. Lempert. 195,292; Fence, barbed wire, H. B. Scutt. 195,239; Fence, board, L. F. Wilder. 195,426; Fence post, J. B. Perkins. 195,229; Fence wire, tightening, J. B. Barber. 195,431; File, bill, J. A. Austin. 195,248; Filter, C. F. Vent. 195,423; Fire escape, G. W. Eyer. 195,354; Fire escape, J. Riedsdorph. 195,401; Fire extinguisher, C. T. Holloway. 195,370; Fire irons, stand for, W. E. Hague. 195,213; Fires in car stoves, extinguishing, Root & Baker. 195,234; Fluting and polishing iron, A. D. Grose. 195,212; Furnace, etc., W. Silvester. 195,409; Gas burner, E. A. Hill. 195,338; Gas exhauster, R. & W. J. Salter. 195,404; Gate, J. W. Harvey. 195,273; Gate, S. B. Hilleary. 195,279; Gems, setting artificial, Pic & Nelson. 195,304; Glass, drinking, C. B. Braunstein. 195,337; Glass vessel, D. W. Norris. 195,385; Glassware, pressing rings on, J. Slim. 195,411; Glove fastening, F. G. Farnham. 195,355; Governor, J. S. Adams. 195,322; Grain and seed drill, Phillips & Dunbar. 195,338; Grain binder, J. F. Steward. 195,413; Grain separator, L. Gathmann. 195,211; Grinding mill, W. N. Cosgrove. 195,349; Guano distributor, J. P. Baker. 195,327; Harvester, J. H. Walton. 195,424; Hay rake, horse, W. G. Barnes. 195,328; Hay rake, horse, A. W. Stevenson. 195,312; Heater, portable lunch, M. Bradley. 195,255; Heating apparatus, A. T. Winchell. 195,320; Hone, J. A. Naber. 195,384; Horse blanket, W. Horisk. 195,371; Horse power, I. D. Albin, Sr. 195,244; Horse power, T. C. Churchman. 195,253; Horse powers, J. R. Dickinson. 195,264; Horses, feed trough for, G. C. Broom. 195,205; Horseshoe, J. J. Mervesp. 195,222; Horseshoe, T. Skelton. 195,410; Horseshoe machine, A. J. Roberts. 195,232; Hose and tubes, J. B. Forsyth (r). 7,837; Hose coupling, G. Sterling. 195,311; Hose reel, B. B. Douglas. 195,265; Hubs to axles, attaching, Allen & Lathrop. 195,245; Hydraulic engine, W. O. Wakefield. 195,314; Ironing table, Barber & Lenox. 195,252; Ironing table, E. C. Hotchkiss. 195,283; Knife, sliding blade sheath, W. T. Whitehouse. 195,319; Lamp, S. S. Newton. 195,227; Lamp bracket, T. J. Jury. 195,289;

Table listing inventions with names and dates, such as: Lamp burner, S. R. Wilmot. 195,241; Lamps, etc., attaching, S. S. Barrie. 195,331; Latch, gate, Cameron & Jowers. 195,339; Latch, reversible, W. F. & H. J. Hall. 195,270; Lathe for turning bobbins, W. R. Landfear. 195,291; Lathes, lifting work into and out of, E. Knight. 195,220; Leg and foot rest, T. Weddle. 195,425; Life boat and launching apparatus, Huber et al. 195,216; Lock and handle for traveling bags, W. Roemer. 195,233; Lubricator, Hall & Pfaffle. 195,269; Manger, J. N. Crabb. 195,351; Mask, smoke-excluding, G. Neally. 195,300; Meat block, N. Wells. 195,317; Meat for preserving, P. Toinetti. 195,420; Mining drills, H. Burk. 195,256; Miter box, G. M. Conover. 195,347; Mosquito nets, Arnold & Petersen. 195,323; Mower, lawn, J. Braun. 195,336; Nut lock, A. W. Bodell. 195,203; Nut lock, D. R. Major. 195,379; Nut-tapping machine, S. L. Worsley. 195,321; Oil burner, O. Tamagno. 195,313; Oiler, D. H. Chamberlain. 195,340; Ores, chlorinating, J. H. Mears. 195,381; Organ reed, J. Pim. 195,394; Oven, baking, S. Axford. 195,249; Overshoe, G. Watkinson. 195,316; Packing for piston rods, Toucey & Scallen. 195,421; Pantograph, E. Ware. 195,315; Paper barrel machine, N. Keely. 195,218; Paper cutting machine, W. F. Hill. 195,273; Pattern chart for cuttingsgarments, E. H. Reeves. 195,308; Pattern for dresses, etc., for drafting, Z. Bauer. 195,332; Pavement concrete block, S. S. Ingalls. 195,236; Pavements, laying concrete, S. S. Ingalls. 195,237; Paving blocks, composition for, J. S. Wethered. 195,318; Piano, K. V. Barnekov. 195,329; Pick, W. L. Cousland. 195,261; Pipe cutter, G. Post. 195,307; Planter, corn, Terrell & Foss. 195,418; Planter, hand corn, M. Cottle. 195,350; Planters, making for hand corn, B. Phelps. 195,392; Plow, O. F. Phillips. 195,303; Plow, J. Seaman. 195,406; Plow, sulky, J. M. Payne. 195,389; Plow, wheel, S. M. Harris. 195,272; Push an cloth, cleaning, J. Besanson. 195,324; Printing presses, M. D. Wilkins. 195,427; Pump, double acting, M. D. Judkins. 195,375; Pump, lift, E. Barnes. 195,253; Radiator, steam, H. E. Light. 195,221; Railway, endless rope traction, A. E. Hovey. 195,372; Railway track clearer, M. C. Isaacs. 195,217; Rivers, flume, establishingchannels, M. J. Adams. 195,201; Roll for beams and girders, J. F. De Buigne. 195,207; Rotary engine and pump, O. Bigass. 195,353; Saddle tree, H. C. & J. R. Still. 195,415; Safe, alarm, J. B. Kingham. 195,219; Sap spout, F. E. Lord. 195,295; Sash fastener, N. H. Miller. 195,223; Sash fastener, M. H. Rison. 195,402; Saw mill, Strobel & Idelman. 195,416; Sawing machine, W. Palen. 195,302; Scale beam, Benedict & Greer. 195,432; Sewing machine, J. R. V. De Castro. 195,262; Sewing machine carpet, J. Hess. 195,277; Shawl or book strap handle, J. Cohen. 195,345; Ship's davits, operating, Mullett & Baird. 195,225; Shutter bower and fastener, T. B. Rogers, Jr. 195,309; Skylight ventilating, J. Harsch. 195,362; Sled, W. Gregg. 195,330; Snap hook and buckle, Cleveland & McConnell. 195,230; Soap-making composition, Elliott & Alexander. 195,267; Solar camera, D. A. Woodward. 195,228; Spark arrester, H. Colford. 195,346; Spike-pointing machine, L. De Lario. 195,208; Spirits, apparatus for rectifying, J. Kast. 195,376; Spool holder, F. W. Claybrook. 195,343; Spooling guide, A. Partridge. 195,228; Steam drum and cooking apparatus, H. Tillack. 195,419; Steam engine, J. J. Anthony. 195,246; Steamgenerators, fusible plug for, H. Hiller. 195,367; Stove, B. Rice. 195,231; Stove and range, I. T. Montross. 195,383; Sucker rod joint, J. Shaw. 195,408; Table extension, F. R. Osgood. 195,387; Tan bark, etc., for compressing, C. Kimplen. 195,377; Telegraph message, copying, W. E. Sawyer. 195,233; Telegraph register, etc., Phelps & Edmonds (r). 7,888; Telegraph sounder, D. E. Shewt. 195,417; Telegraph transfer process, W. E. Sawyer. 195,237; Telegraph transmitter, W. E. Sawyer. 195,236; Telegraphs, regulator for, W. E. Sawyer. 195,235; Thill coupling, F. C. Potter. 195,230; Toaster and broiler, S. Poole. 195,306; Tobacco leaves, coloring, E. J. Oppelt. 195,386; Top, spinning, C. A. Bailey. 195,326; Toy money box, G. Zuckschwerdt. 195,430; Toy watch, L. L. Grandperret. 195,434; Toy with string, J. Hemminger. 195,365; Valve, S. Lloyd. 195,294; Vapor burner, H. Wellington. 195,240; Vegetable grater, A. W. Dowdell. 195,352; Vehicle, pleasure, C. W. Saladee (r). 7,889, 7,890; Vehicle spring, L. A. Fogg (r). 7,891; Veneer, manufacturing, W. E. Brock. 195,333; Ventilator for windows, T. W. Bracher. 195,335; Wagon brake, C. Heinen. 195,275; Wagons, for unloading, A. M. McLeran. 195,298; Wash board, D. E. Hall. 195,214; Wash board legs, machine for, C. T. Brandon. 195,204; Washing machine, B. F. Henry. 195,364; Washing machine, J. B. Jones. 195,288; Washing machine and churn, Clarke & Collins. 195,259; Watch barrels, E. H. Flint. 195,268; Water closet, H. C. Price. 195,397; Water cylinders, valve for, T. H. Bailey (r). 7,886; Water wheel, J. C. Horton. 195,215; Weather strip, W. H. Cosper. 195,206; Wrench, J. Eisenman. 195,266; Wrench, L. E. Robinson. 195,408;

DESIGNS PATENTED.

- 10,250.—PLAYING CARDS.—V. C. Clayton, Brooklyn, N. Y.
10,251.—COMBINED CHIMNEY AND GLOBE.—E. D. Dithridge, Pittsburg, Pa.
10,252.—CHAIRS AND SOFAS.—P. P. Kuehorth, Buffalo, N. Y.
10,253.—PICTURE FRAME.—E. Mulligan & J. H. Wood, Brooklyn, N. Y.
10,254.—LAMP CHIMNEY OR GLOBE.—P. Zimmerman, Pittsburg, Pa.
10,255.—EMBROIDERY PATTERNS.—E. Crisand, New Haven, Conn.
10,256.—IMPRINT ON BARS OF SOAP.—N. W. Fisk, Springfield, Mass.
10,257.—FONT OF ORNAMENTAL PRINTING TYPES.—J. Herriet, New York city.

[A copy of any of the above patents may be had by remitting one dollar to MUNN & Co., 37 Park Row, New York city.]