

soda crystals with milk of lime, produced by slacking 1/2 lb. of quicklime with hot water well stirred; then rinse them in a fresh caustic soda or potash solution and transfer immediately to the silver bath.

(33) V. & G. say: 1. We cut off steam at 8 inches on one end and 10 inches on the other end of our 14x28 inches cylinder. Is this right? We find that if we make it cut off alike on both ends that the valve opens wider on one part than the other. A. It is impossible in a common slide valve to make the points of admission cut off and release equal for each stroke; and it is preferred to keep the points of admission equal. 2. There is about 3/4 of an inch space between the cylinder head and the follower. Would we save any steam to make our cylinder head thicker and reduce this space? And if so, how much space should there be? A. Yes. About 1/4 inch. 3. Is a variable cut-off valve, working on the back of the main valve, better than to vary the cut-off of the main valve by raising or lowering one end of the eccentric rod on an arm? A. It is considered so.

(34) L. H. R. asks: 1. In electricity, what is an ohm, and why is it so called? A. The ohm is the unit of resistance in electrical measurements. It is equal to the resistance of a prism of pure mercury, one square millimeter in section, and 10486 meters long, at 0° C. The name ohm was given the unit in honor of Dr. Ohm, a celebrated physicist. 2. In chemistry, which of the two metals, zinc and lead, has the greater affinity for silver? A. Zinc.

(35) A. H. R. says: I wish to make a pair of waterproof pants, in which to work in water from 6 to 10 hours at a time, without getting wet through. Will twilled cotton, thoroughly coated with raw oil, answer the purpose? Or is there any better coating? A. No. Try a mixture of about 10 parts boiled oil and 1 part beeswax, thinned down so as to readily penetrate the cloth. A better way is to use a thin varnish made by dissolving india rubber in bisulphide of carbon containing about five or six per cent of absolute alcohol. A very thin coat of the varnish will answer, and is cheap.

(36) J. K. T. asks: Is there any way to shrink boots, which have been stretched while wet, into shape again? A. We do not know of any. How can I polish a gun stock? A. Put on several good coats of shellac, rubbing each one down when dry with pumicestone, and finish with a fine linen wax kept constantly moistened with thin alcoholic shellac and occasionally a drop of oil.

(37) B. L. H. asks: Will you please inform me of the process of marbling iron? A. See article on enameling iron ware, p. 21, vol. 36. The variegated colors may be produced by the addition of oxide of antimony, manganese, and iron to the glazing, before the final fusion. This also answers W. M.

(38) A. R. S. asks: How can I get the impression of an article in plaster of Paris without the article becoming set in the plaster? A. If there are any inward curves or angles in the model you cannot make a correct cast of it at once. For intricate work the model must be in several parts, from each of which a separate cast is taken; and then all of them properly joined to form one mould. This subject has been dealt with in detail by Mr. Joshua Rose in late numbers of the SCIENTIFIC AMERICAN. Where the undercut curves or angles are not very sharp, it is sometimes possible to get a cast in glue, which, being more elastic than plaster, admits of a certain amount of compression and stretching in removing the pattern. The water in which the glue is dissolved is mixed with enough glycerin to retain the glue as a stiff jelly on cooling. The patterns are carefully oiled before being brought into contact with the glue. From the first cast a second one, in glue, may be taken, and from this, in turn, a plaster cast, thus copying the first.

(39) T. W. asks: What is the best non-conducting material (for heat) whether of animal, vegetable, or mineral nature? A. Among substances of animal origin, feathers, wool, hair, silk, etc., are the best. Among vegetable substances, charcoal, sawdust, shavings, cotton, and dry fibers in general. All these, when dry, are excellent non-conductors. Of mineral substances, asbestos, mineral wool, porous tiles, and clay bricks, also slabs or bricks of porous infusorial earth, etc.

(40) N. M. W. asks: How can I clarify and polish horn? A. It is usually first scraped, and then rubbed down with emery powder and water, and finished with tripoli or rouge. In working horn, the bony core should first be removed by soaking in cold water for several weeks, which treatment loosens the core, so that it may be pulled out. Boiling water temporarily softens horn; and while soft it may be slit, and spread out by pressure between hot iron plates.

(41) A. L. B. says: In one of your papers I see a statement of the effect of sulpho-carbonate of potassium on the eggs of the potato bug. Would the application of this chemical to the field be likely to poison the potatoes, so as to make their use dangerous? A. No; but it may impart an unpleasant smell to some of the tubers, if used excessively.

(42) Z. H. asks: 1. Can grain nickel be melted in an ordinary furnace used for melting brass? A. If the furnace is provided with a very good draught, you may succeed in fusing small quantities of it at a time. It requires a very high temperature, and a long exposure in the furnace to get it liquid enough to run. 2. Will it run without an alloy? A. Yes.

(43) A. L. S., Queensland.—Remit 16 shillings sterling for SCIENTIFIC AMERICAN one year, which includes postage.

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

J. M. B.—A is properly an agate, of little value. B, are pebbles of milky quartz and flint.—W. J.—It is a clay containing a considerable amount of infusorial silica. It is an excellent article for polishing purposes, and, if properly washed, might prove marketable.—J. H. C.—No. 1 is an indurated clay, contain-

ing much oxide of iron. No. 2 is a piece of red jasper. No. 3 is a felspathic rock, containing small specks of iron pyrites and chalcopyrite (sulphide of copper). No. 4 is nodular pyrites (marcasite). See p. 7, vol. 36. None of the specimens are valuable.—H. W. S.—It is mostly magnetic pyrites (pyrrhotine).—M. S.—No. 1. The coating contains manganese and very probably zinc. No. 2 is an earthy oxide of cobalt—a variety of No. 1. No. 3 is gneiss rock with sulphide of iron. No. 4 is magnetite.—F. H. P.—A is a piece of hornblende. B is gneiss rock, with a few iron garnets. The crystal is calcite—carbonate of lime.—M. W. R.—It is mica schist (a silicate of potash, alumina, magnesia, and iron) with chlorite (a hydrous silicate of magnesia, iron, and alumina).—K. H. R.—They are pebbles of flint, common agate, chalcedony, and quartz. We do not consider them valuable. Such pebbles can be found on most sea shores. It is impossible for us to say where the pebbles came from, or where similar ones could be found in quantities. We have seen magnificent agates from the Pacific coast, and we understand that they abound near San Diego, Cal.—E. E. E.—It is not coal, but clay containing a large amount of carbon.—C. A. M.—It is a wax, called by dealers Carnauba wax.

M. B. & R., of Melbourne, Australia, say: The greatest enemy that the fruit gardener has to contend with in this colony is the sparrow, and it seems a matter of great wonder that no means have yet been introduced to stop its ravages. Those who have not had ocular demonstration would scarcely credit that these little creatures could commit such havoc. Settling in flocks upon the choicest fruit trees, they will quickly completely denude them of every particle of ripe fruit. Here is an opportunity for the ingenious American to distinguish himself by inventing some contrivance to preserve the trees from their ravages. Of course the invention must also have the merit of cheapness, so as to bring it within the reach of all classes.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects: On Painting Axes. By W. E. W. On the Dunkirk Microscopical Society. By C. P. A., and by J. E. S. On the American Cicada. By H. H. On a Discovery in Geometry. By L. S. B. On Torpedoes. By J. P. W. On Converting Motion. By F. S. On a Decimal System of Computing Time. By C. E. D. On Capital and Labor. By ——. On Boiler-Covering Composition. By P. C. On Liquors. By C. F. F. On Water Evaporated through Engines. By W. A. M. Also inquiries and answers from the following: C. M. K.—S. B. E.—A.—J. B. B.—A. S.—J. M. W.—A. S. T.—J. E. B.—B. K. A.—W. O. W.—J. C. H.

HINTS TO CORRESPONDENTS.

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 machines for breaking down rice straw for paper-making? Who sells steam heaters, in which the heat may be readily varied to suit the wants of the household? Who sells electric candles, as described on p. 339, vol. 36? Who sells decorative tiles? Who sells hydraulic lime?" 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 May 15, 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, including: Awl haft, N. B. Ditt Lepine, 190,747; Bag fastener, A. B. Cate, 190,666; Bag machine, Arnold & Quigley, 190,663; Baling press, J. E. Hanger, 190,852; Bark mill, W. F. Mosser, 190,777; Barrel trussing machine, W. Bayley, 190,731; Basin, J. H. Keyser, 190,766; Bed bottom, G. Eade, 190,749; Bee hive, G. Kraetzer, 190,874; Bee hive, N. Zimmerman, 190,947; Bessemer converter bottom, E. J. Mildren, 190,890; Binder, hand, J. O. Brown, 190,701; Binder, hand, J. O. Brown, 190,702; Bird cage support, F. W. Long, 190,881; Blackboard eraser, H. L. Andrews, 190,662; Blackwashing device, N. K. Wade, 190,697; Blind slot adjuster, H. Gaylord, 190,847; Blowing machine, Cochran & Hendy, 190,828; Blowing machine, J. W. Wilbraham, 190,943; Bone black revivifier, J. Gandolfo, 190,676; Books, binding, W. Gilliland, 190,677; Boot and shoe, T. J. Greenwood, 190,753; Boots, crimping, L. O. Makepeace (r), 7,686; Boot uppers, crimping, I. H. & J. D. Spake, 190,922; Bootjack blanks, forming, H. A. Brown, 190,735; Bottle, composition seal, C. M. Jacob, 190,885; Breech loading firearm, H. W. Chapman, 190,820; Bridge truss, J. H. Snyder, 190,921;

Table listing inventions with names and dates, including: Bridle bit, F. R. Kuehnhold, 190,876; Broom, A. Stephen, 190,726; Brush, R. W. Champion, 190,821; Brush handles, making, J. L. Whiting, 190,941; Buckle, belt, W. Roemer, 189,906; Bung and wash, combined, E. Rodier, 189,906; Butter worker, Cornish & Curtis, 190,707; Butter worker, G. Bidler, 190,692; Cane and pipe, Hirsch & Ettinger, 190,859; Car brake, I. R. Oakford, 109,889; Car coupling, P. Hien, 190,858; Car coupling, E. B. Middleton, 190,775; Car coupling, G. M. Thompson, 190,931; Car pusher, J. E. Gearhart, 190,848; Car starter, C. A. Harvey, 190,853; Car starter, L. Russell, 190,900; Car starter, G. M. Thompson, 190,930; Casing spear, F. J. Fox (r), 7,655; Casting, composition for, A. Kiesele, 190,769; Chair, F. H. Foster, 190,812; Chair back and seat, H. C. Knowlton, 190,872; Chair, folding, H. Closterman, Jr., 190,827; Chair, nursery, J. C. Wheeler, 190,830; Chair, reclining, H. S. Smith, 190,788; Change box, O. White, 190,942; Churn, D. C. Chadwick, 190,667; Churn, reciprocating, E. Brough, 190,751; Churn, reciprocating, J. Clinchinst., 190,705; Cider press, S. M. Ellis, 190,713; Cigar, M. Gelston, 190,819; Cigar cutter, H. F. Schultze, 190,784; Claw bar, C. A. Miller, 190,887; Clewing up topsails, W. H. Daro, 190,831; Cloek dial, H. J. Davies, 190,671; Cook, automatic, G. F. Hammer, 190,080; Coin wrapper, G. Rettig, 190,903; Corkscrew, M. L. Crannell, 190,669; Corn planter, J. Rand., 190,900; Corn planter, etc., J. E. Williams, 190,914; Corn Planter attachment, W. R. Cunningham, 190,830; Corn sheller, E. S. McEwen, 190,721; Cotton chopper, etc., E. C. L. Bridges, 190,815; Cradle, J. L. Butler, 190,817; Cultivator, J. R. Tilley, 190,796; Cultivator, coupling, W. P. Brown, 190,816; Darning last, M. B. Crowninshield, 190,745; Dental chair, J. B. Morrison (r), 7,657; Desk, school, J. Peard, 190,896; Desks, folding seat for school, O. Davis, 190,832; Dish, culinary, S. W. Mathewson, 190,688; Disks for stamper shanks, J. Cliff, 190,668; Doffer combs, operating, E. R. Coverdall, 190,714; Door check, I. J. Webber, 190,939; Door stop screw, O. Mongeau, 190,776; Ear slipper, I. B. Kleinert, 190,720; Eggs, desiccating, Stoddard & Flint, 190,927; Electric light, carbon, P. Jablockhoff, 190,864; Engine, rotary, T. F. Sparrow, 190,923; Engraving machine table, A. E. Ellinwood, 190,750; Fare register, P. Seyl, 190,912; Feed cooking, steam, C. & W. Kramer, 190,873; Fence wire, barbed, J. Dobbs, 190,836; Firearms, rear sight for, C. F. Robbins, 190,782; Fire escape, M. Durand, 190,837; Fireman's belt, F. Costantino, 190,829; Flying machine, F. Barnett, 190,730; Fruit crate, J. H. Marvil, 190,883; Fruit drier, J. R. Dodge, Jr., 190,748; Fruit drier, Kelly & Cole, 190,685; Fuel, artificial, W. C. A. Roettger, 190,724; Furnace blower, etc., L. C. Cook, 190,706; Fuse, percussion, B. B. Hotchkiss, 190,861; Gage, J. K. Underwood, 190,933; Gage, carpenter's, G. W. Vaughan, 190,934; Gage, pressure, W. T. Snyder, 190,790; Galvanic battery, C. R. Jennison, 190,684; Gang edger, Evans & Snyder, 190,840; Gas and water pipe cut-off, F. Jarecki, 190,868; Gas burners, liquid, H. W. Dopp, 190,673; Gas carburetor, C. A. Enggren, 190,714; Gas furnace, C. W. Siemens, 190,915; Gas holder, W. & R. H. Smith, 190,918; Gas retort lids, fastening for, N. Jamin, 190,867; Gate, automatic, J. E. Goldsworthy, 190,715; Gate, farm, H. N. Dunbar, 190,674; Gearing machine, Singleton & Wingfield, 190,916; Gearing, screw, H. Hackman, Jr., 190,679; Grain binder, G. A. Walker, 190,936; Grain, curing, H. H. Beach, 190,800; Grain separator, L. V. Davis, 190,746; Grate bar, A. E. Barthel, 190,805; Gun, spring air, O'Connor & Dinnan, 190,893; Harness saddle loop, Monteith & Mesick, 190,891; Harrow, F. M. Davison, 190,833; Harrow, D. McIlrevey, 190,774; Harvester rake, J. H. Meyers, 190,778; Hay elevator, G. Van Sickle (r), 190,681; Hay loader, J. W. & E. Small, 190,725; Heddle frame, G. Crompton, 190,708; Hinges, making, L. B. Gasman, 190,850; Hoe, J. S. Lester, 190,878; Hoisting and conveying, F. A. Clarkson, 190,712; Hominy mill, G. B. Gains, 190,675; Hoof parer, J. Hilger, 190,682; Hop dryer, S. R., J. C. & J. H. Templeton, 190,794; Hop extract, composition, J. R. Whiting, 190,801; Horse hay rake, J. Badger, 190,729; Horse hay rake, B. & E. P. Morse, 190,892; Horse hay rake, D. W. Travis, 190,696; Horse hay rake, H. C. Velle, 190,925; Horseshoe, J. R. Cancelo, 190,740; Horseshoe bar, A. Barton, 190,800; Hose to couplings, securing, S. Adlam, Jr., 190,738; Hot air furnace, W. McFarland, 190,773; Hydraulic motor, J. M. Bois, 190,700; Incrustation, removing, H. H. Kreamer, 190,770; Insect destroyer, C. H. Emerson, 190,838; Iron, manufacture of, W. H. St. John, 190,926; Jar cover, closing, T. A. Weber, 190,940; Knitting machine, J. M. Slack, 190,694; Knob, metal, A. B. Hendryx, 190,855; Lamp, L. H. Olmstead, 190,894; Lamp burner, E. C. Lawrence, 190,877; Lamp chimney, J. McMurtry, 190,886; Lamp chimney, shade, etc., G. W. Martin, 190,882; Lamp, safety collar, J. H. Lewars, 190,879; Latch, closet, W. E. Sparks, 190,792; Leather, stretching, J. Sharp, 190,693; Lifting jack, I. D. Johnson, 190,718; Liquid diffuser, G. M. Smyth, 190,789; Liquids, conveyance of, G. W. Remsen, 190,902; Lock for satchels, etc., W. Roemer, 190,907; Loom stop motion, F. Christen, 190,741; Loom temple, C. H. Schlaf, 190,783; Lounge, folding, H. S. Carter (r), 7,685; Lozenge machine, C. H. Hall, 190,754; Lubricator for steam engines, W. Moses, 190,722; Lubricator for journals, J. H. Burnett, 190,665; Malt extract, separating, H. R. Randall, 190,899; Malt extract, making, H. R. Randall, 7,689; Marking ground, F. W. Byrne, 190,819; Metallurgical hearth, removable, A. Ponsard, 190,691; Moulding and casting pipe, J. K. Dimmick, 190,835; Motion converting, J. Smith, 190,917; Motor, J. C. Butler, 190,818; Neck tie retainer, L. Hussey, 190,803; Nut lock, Brown & Huey, 190,750; Nut lock, J. A. McCray, 190,883; Ore washer, D. Beaumont, 190,809; Organ action, reed, G. Woods, 190,693; Organ case, L. K. Fuller, 190,843; Organs, etc., coupler for, R. E. Letton, 190,687; Paint, W. P. Jenney, 190,761; Pantograph, E. Ware, 190,797; Paper box, C. M. Arthur, 190,803; Paper box, H. L. R. & O. Wolf, 190,945; Pen, fountain, H. N. Hamilton, 190,755; Picture hanger, I. Piles, 190,690; Pillow ventilating, J. T. Hatfield, 190,854; Pipe cutting machine, N. Watson, 190,798; Pitman, H. L. Hopkins, 190,860; Pitman connection, J. W. Blood, 190,733; Plow, G. B. Clarke, 190,826; Plow, H. Opp, 190,779; Plow, S. G. Reynolds, 190,904; Plow, W. M. Towers, 190,932; Plow jointer, J. Densmore, 190,672; Plow, reversible, J. Gogel, 190,678; Plows, stubble guard for, B. F. Phillips, 190,781; Plows, sulky attachment for, W. K. Bushnell, 190,737; Pocket books, safety attachment for, T. Ferguson, 190,751; Pocket, safety, F. Wendt, 190,739; Pump, H. M. Jones, 190,870; Pumps, R. M. Lafferty (r), 7,677, 7,678; Pump bucket, chain, E. Miller, 190,889; Pump cut or valve, J. Mansir, 190,772; Pump, anti-freezing force, H. M. Wyeth, 190,946; Pump valve, R. M. Lafferty (r), 7,676; Punch for leather, etc., C. & A. B. Jenkins, 190,883; Punching metal, etc., A. Lee, 190,771; Quilting frame and clothes bar, A. E. Furness, 190,844; Railway rail joint, Ilbotson & Talbot, 190,863; Railway rails, slitting, J. Reese (r), 7,680; Railway tie, A. H. Campbell, 190,739; Refrigerator, S. Gasper, 190,846; Refrigerators, ice floor for, D. J. Stuart, 190,828; Rock drill, R. Allison, 190,699; Rock-drilling machine, Keeley & Fleming, 190,871; Roofing, fireproof, A. C. de la Martelliere, 190,834; Rope or cordage, etc., reeling, B. Bevelander, 190,811; Rowlock, W. Spelman, 190,793; Sash fastener, C. E. Hicks, 190,759; Saw, hand, Shave & Reams, 190,914; Saw mill, muley, T. E. Chandler, 190,822; Sawing machine, F. 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Draper, 190,710; Spinning top roll support, Hardenbergh & Holmes, 190,756; Spittoon, P. C. St. Marie, 190,924; Steam boiler, circulating, H. S. Coleman, 190,743; Steam cylinder, relief, J. M. Hartman, 190,757; Steam engine, L. H. Hall, 190,851; Steam engine, Warrick & Brush, 190,938; Steam engine, rotary, Scudder & Wager, 190,785; Steam generator, water tube, J. B. Herreshoff, 190,857; Steam trap, T. Kieley, 190,719; Stove extinguisher, car, Pogram & Hotchkiss, 190,790; Stove heating, Bowman, Franklin & Colby, 189,813, 190,814; Stove leg, P. Hauersperger, 190,716; Stove mat, Reimers & Branch, 190,901; Stove pipe shelf, J. W. Jackson, 190,760; Stoves, casing for car, H. Tanner, 190,929; Straw cutter, E. M. Hesselboom, 190,758; Suspender stay, G. Butterfield, 190,738; Table leaf support, N. A. Hull, 190,717; Tailor's measure, G. H. Lasar, 190,686; Tea and coffee pot handle, A. Bayley, 190,807; Teething nipple, C. E. Rogers, 190,908; Telegraph, quadruplex, G. B. 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Gould, 190,752; Whiffletree hook, N. Y. Shaw, 190,913; Windmill, Warwick & Marshall, 190,937; Windmill, W. A. Williams, 190,802; Wire rope, spleinik, H. Channon, 190,823; Woven fabrics, finishing, J. Short, 190,786;

DESIGNS PATENTED.

9,971.—SHADE RINGS.—L. J. Atwood, Waterbury, Conn. 9,972.—CASSIMERES.—G. C. Burns, Burrillville, R. I. 9,973, 9,974.—HANDLE EARS.—R. H. Burr, West Meriden, Conn. 9,975 to 9,987.—WALL PAPER.—C. Dresser, London, Eng. 9,988.—OVERSHOES.—A. S. Hubbard, New Haven, Conn. 9,989.—LAMP BRACKETS.—A. D. Judd, New Haven, Conn. 9,990.—CASSIMERES.—C. Kimball, Mohegan, R. I. 9,991.—GLASS JAR.—S. R. Pinckney, New York city.

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