

the metal and have a brass founder cast it. See SCIENTIFIC AMERICAN, vol. 62, No. 26, page 402, for full directions for working aluminum.

(2715) A. A. says: Please allow me to intrude on your valuable time for a decision on a little matter in dispute. The question is, is there any more pressure in the steam space of a boiler than there is at the base of a boiler where the water is? For example if a locomotive boiler has 100 pounds steam on it, is there 100 pounds pressure in the water leg of the boiler? It is being argued that the pressure is lighter where the water is than in the steam space. A. There is more pressure in the bottom of the boiler leg than in the steam space by the value of the weight of water above. If there is 4 feet of water, there will be about 134 pounds more pressure per square inch.

(2716) P. V. W. W. writes: I wish to learn what solution will dissolve bromide of silver besides sodium hyposulphite and potassium cyanide. A. Ammonia to some extent.

(2717) R. R. says: Please inform me what is the velocity of upward flow of water through a smooth iron suction pipe 5 inches diameter, held perpendicularly 15 feet high, with a perfect vacuum? A. With a constant flow under vacuum, the velocity will be 31 feet per second, less the friction of the pipe, which will lessen the velocity about 3 feet, or a resultant of 28 feet per second.

(2718) H. P. asks: Will you please tell me through your columns how to arrive at the speed a train is running by the number of clicks made by the wheels and rails? How many editions of Haswell are there, their subjects or names, and price? How many pounds of stone (limestone) to the cord? A. Count the clicks per minute and multiply by 30, the usual length of rails in feet, divide the product by 5,280 for miles per minute. The ordinary rule is to count the clicks in 20 seconds. This gives approximately miles per hour. The error is less than 2 per cent. The 54th edition of Haswell's "Mechanic's and Engineer's Pocket Book," 1890, price \$4 mailed. A cubic foot of limestone weighs about 170 pounds, 2 1/4 cubic feet in a perch, 128 cubic feet in a cord.

(2719) J. H. H. & J. W. R. say: Kindly advise if ice was ever known to sink in water and under what circumstances. Also if you know of any record where ice in a lake or pond has been known to sink any time during the winter or spring, or otherwise disappear before having been melted. A. The ice on rivers and lakes becomes crystallized in the form of vertical needles with their interstices saturated with water, supposed to be produced by the increasing intensity of the sun's heat in the spring. This weakens the ice to such an extent that by stamping upon it at the critical time it breaks up into fine needles. At such times, on any disturbance of the surface by wind, or sometimes without apparent cause, the whole surface disintegrates, and the crystalline mixture with the warmer water below is melted. If examined at the moment of breaking up, the fine acicular crystals will be found floating on the surface, although at a short distance nothing can be seen but the water surface. It is a matter of common observation that ice 8 or 10 inches thick becomes so weak from crystalline disintegration near the critical time for breaking that it will not bear pressure, and will break through with a person walking upon it. We have no record of ice sinking from the surface in a body, but have noticed the surface sometimes flooded with several inches of water from overflow. The Hudson River and Lake Champlain are noted for the exhibition of this phenomenon. But ice never can sink in water unless drawn under by some current, or sunk by stones and earth which it may have picked up.

(2720) F. V. M. asks for receipt for making albumen paper. Albumen paper is a special photographic paper coated with a film of albumen. It is manufactured on a large scale and is sold by dealers in photographic materials, cheaper than it can be made in a small way. For gelatin-bromide emulsions, see Abney's book on "Photography, with Emulsions," which we can supply.

(2721) O. M. asks how the lacquering of brass is done. My work proves all streaked, not even and nice. How thick should the lacquer be, and how warm should the brass be? A. The lacquer should be made thin and clear as wine, only 95 per cent alcohol used. Settle for a day or two and decant the clear lacquer. Heat the articles to about 160° Fah., or a little hotter than the hand can bear. Brush the lacquer over the work quickly with a flat camel's hair brush. A stove oven moderately warm is a good means for heating. After lacquering return work to the oven for a few minutes to dry and glaze. Zapon lacquer advertised in our columns may be applied without heat and without showing brush marks.

(2722) E. E.—The number of passenger cars used on the steam railways of this country is estimated at thirty thousand, and their average value three thousand dollars each.

(2723) W. S. V.—Chemically prepared paper for autographic and automatic telegraphy is prepared by soaking it in either of the following solutions: Nitrate of ammonia 2 pounds, ferricyanide of potassium 1/2 ounce, gum tragacanth 2 ounces, glycerine 2 ounces, water 1/2 gallon. Or, iodide of potassium 1/2 pound, bromide of potassium 1 pound, starch 1/2 ounce, water 2 quarts.

(2724) S. asks: What is the composition of ordinary japan? A. "Japan" has several meanings. The liquid drier contains linseed oil, litharge, and often some salt of manganese. For japanning tin or metal by heat the basis is linseed oil to which some gums and other ingredients are added. Black japan is made by dissolving 48 pounds Naples or certain other foreign asphalt in 10 gallons of linseed oil; 8 pounds of gum animi are mixed with 2 gallons of hot oil and added. To this 2 gallons of amber are added, mixed, with 2 gallons more of hot oil; it is boiled for some time, driers are added, and it is thinned with turpentine. Brown japan is a composition of shellac dissolved in linseed oil. In Spence's Encyclopedia a great many formulas for japanes for fine japanning are given.

(2725) W. H. W. asks: 1. Is the induction of the current the same on the wire wound on the inside of the Gramme ring of the armature in the dynamo explained in "Experimental Science," Fig. 485, or does it only act as connection for the other half of the coil on the outside? A. The wire on the inner side of the Gramme ring acts only as a conductor. It is practically of no use in generating the current. 2. Does an armature wound with the wire only on the outside of Gramme ring answer the same purpose as one in Fig. 485, or is this one (Fig. 485) best, and for what other purpose than that in case one of the coils should burn out (I am speaking now of a more expensive machine) it could be replaced without unwinding all of the wire? A. It is unnecessary to unwind from a Gramme ring anything more than the damaged part. Rings with sectional core are common. These are provided with coils made separately and applied. 3. Please recommend one or two books on aluminum, price not to exceed \$2. A. We recommend "Aluminum," by Richards, which we can supply, price \$5.

(2726) M. A. asks for something for restoring writing. I have an army discharge of my husband's, and he is dead. It is on some kind of skin and got oil spilled on it, and blurs the writing where it was filled out, and makes some of it so dim that you cannot see it to read. Please mention a restorative as best you can. A. Try washing over with a solution of tannic acid. We advise you to have it done by an expert. The solution should be applied carefully with a brush. There is danger of washing all away.

(2727) E. C. L. M. asks how the round wooden eaves troughs and conductors are made. Are the smaller sizes sawed out of the center of the large ones? If so, how? Two gentlemen in this vicinity were once speaking of the size of pipe that could be used as a siphon. One of them, a practical engineer, said that large pipe would not carry water as high as small pipe of the same length, if it would work at all. The other thought that one would work as well as the other. Which one was in the right? If large pipe will not work, will you please explain why? A. Wooden eaves trough may be made on a heavy wood-shaping machine. There is no reason why a large pipe siphon will not work efficiently for the full height that any siphon will operate. They only require caution against leakage and provision for keeping out air.

Replies to Enquiries.

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

(2603) White Finish for Shoes.—I would suggest to inquirer 2603 that if he will use the following, he will get a good white finish on his shoes:

- Best white bonnet glue 1 lb.
Sulphate zinc c. p. 1 1/2 "
Sulphate copper, ground 2 "
Pipe clay bolted 1 "
Sulphate magnesia 1 "
Light yellow ochre 2 oz.
Water 4 gals.

Mix and let it stand until all is dissolved, then bring to boiling point and add 2 pounds oxalic acid and gum tragacanth q. s. Iron or gum brush, in the usual way, and wax. If this is properly used, the red color will not work through.—C. A. H.

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 January 6, 1891. AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions with names and page numbers, including Advertising wagon, Agricultural system, Alarm, Annunciator, Automatic pneumatic brake, Axle boxes, Axle nut, Axle, Vehicle, Axle washer, Back band, Bag fastening, Baking machine, Balance wheel, Baling press, Bearing, anti-friction, Bearing, anti-friction, Bed, folding, Bedstead, Folding parlor, Bells, device for use in brazing and coating stock, Bicycle, Bin, See Flour or meal bin, Bit, See Drill bit, Bit, F. J. Roche, Bit stock, W. S. Davis, Blind and frame therefor, sliding Venetian, C. Niss, Jr., Board, See Engineer's order bulletin board, A. Vask, Boat, Boiler, See Coffee boiler, Water coil boiler, Boiler, T. A. Kidd, Book cover, P. Cloes, Book, statistic, F. W. Barrett, Boots and shoes, machine for uniting the soles and uppers of, W. Carey, Bottle stopper, G. C. Clark, Bottle washing machine, S. Twitchell, Bottles, feed stopper for muclage, W. A. H. Stafford, Box, See Cask box, Letter box, Signal box, Brass, See Gate brace, Brake, See Automatic pneumatic brake, Car brake, Wagon brake, Brake beam, J. Pearce, Brake beam, W. A. Pungs.

Table listing inventions with names and page numbers, including Brake shoe, A. S. Vogt, Brick or tile table, G. S. Tiffany, Bridle, H. G. Brent, Bridle attachment, A. Chezem, Brown corn, compound for coloring, R. M. Dono, Brooms, etc., holder or rack for, D. Van, Buggy body, N. Kastler, Butter package, R. A. Kneeland, Butter worker, H. J. Anderson, Calendar, order pad, W. H. Haworth, Can, See Self-closing can, Can body forming and side seam soldering machine, F. M. Leavitt, Candy cream cooler, T. Burkhard, Car brake, W. H. Botwell, Car brake, electric, B. L. Randall, Car brake, street, H. M. Elliott, Car coupling, W. W. Gelatt, Car coupling, G. A. Hendricks, Car coupling, J. La Burt, Car door, D. E. Romick, Car door fixture, freight, Cole & Grieves, Car doors, bracket support and stop for, Cole & Grieves, Car for street railways, cable, W. Robinson, Car indicator, F. J. Boris, Car motor, E. Maden, Car seat, railway, J. C. Mitchell, Car spring check, W. Robinson, Car stock, J. B. Stoner, Cars, card case for freight, Cole & Grieves, Cars, draw bar for passenger, W. Wylie, Cars, means for venting, E. Lazarus, Cars, sand box for, W. V. H. Willson, Carpet fastener, R. J. Johnson, Carpet stretcher, G. A. May, Carriage, folding baby, A. R. Buckton, Carriage top joint, J. P. Groves, Carriage wheel, H. C. Wilson, Cartridge, metallic, M. J. Cuadros, Carving machine, J. Rohlmann, Case, See Medicine case, Cash register, H. Cook, Cash register, A. H. Herr, Cash register and indicator, W. H. Clark, Cash register and indicator, E. B. Parkhurst, Casting spear, D. W. Black, Casting, J. L. Sebenius, Casting hot types, machine for, W. S. Scudder, Chair, See Folding chair, Chairs, spring attachment for tilting, R. Hendrickson, Check rein hook, F. L. Adams, Chute and hopper for charging retorts, combined, K. M. Mitchell, Clamp, See Pipe and clamp, Cleaning composition, D. E. Sumner, Clinometer or slope measurer, J. H. Parks, Cloth cutting machine, A. Warth, Clothes line, A. D. McCallen, Clothes line, J. H. Brewer, Clothes line stretcher, W. Somers, Clothes pin, C. A. Ostrom, Cock box, street stop, B. Porter, Cock, gauge, J. Jungbluth, Coffee boiler, G. A. Phifer, Comb, See Curly comb, Conveyor, pneumatic, J. W. Beach, Cooler, See Candy cream cooler, Copies from ink impressions, producing press, C. Mitchell, Copier and book, combined letter, D. N. McClintock, Cornice, curtain, G. E. Strauss, Cosmetic, remedial, I. W. Trent, Cotton gin, saw, Winship & Garraux, Cotton press attachment, J. J. Hiser, Coupling, See Curly comb, Pipe coupling, Pole coupling, Thill coupling, Crucible kiln, C. W. Dwell, Crucible kiln, G. Nimmo, Crutch, L. A. Wildhack, Cull retainer, Bender & Scheidemann, Cultivator, R. G. Gabe, Cultivator, T. Neitsch, Cultivator, C. S. Ruef, Cultivator attachment, M. J. Reed, Curry comb, S. Rogers, Curtain pole, G. E. Strauss, "Dental nerve cutter, J. W. Ivory, Derrick, D. F. Oliver, Detergent, J. Scharr, Distilling apparatus, oil, A. Mason, Distilling oil, A. Mason, Door check, H. L. Dedde, Door check, M. C. Richards, Double acting engine, C. A. Tower, Double joint-yoke engine, C. H. Sergeant, Dredgers, joint for suction pipes of, W. P. Humphreys, Drill, See Grain drill, Drill bit, J. T. Snyder, Drill stock, B. F. Smith, Drilling machine, hand, E. Moser, Drum, heating, P. J. Tracy, Electric conductors, tightening device for suspended, D. Mason, Electric conduits, manhole for underground, W. H. Hart, Electric machine, dynamo, A. G. Holcombe, Electric motor, C. J. Van Depoele, Electric switch, C. E. Wilson, Electric wiring, moulding for, G. Cutter, Electrode, secondary battery, S. C. C. Currie, Elevator, See Sucker rod elevator, End gate fastening, J. J. Cook, Engine, See Double-acting engine, Double-acting engine, gas engine, Engineer's order bulletin board, C. W. Kemp, Envelope, R. W. Bambridge, Envelope, B. G. Button, Exhibition purposes, device for, S. R. Ellis, Eyeglasses, H. E. Kirstein, Fare recording register, J. Danc, Jr., Faucet, E. B. Wilder, Faucet, self-closing, G. W. Renton, Felting fur bodies, H. W. Flagg, Fence, G. A. Christ, Fence, S. M. L. House, Fence, J. C. Tauber, Fence, J. C. Tauber, Fence, wire, A. Land, Fertilizer distributor, Deutscher & Becker, Fertilizer distributor, W. C. Eiters, Fire escape, S. M. Stevenson, Fire kindler, R. Guenther, Fire or burglar alarm, W. Henry, Flax, hemp, jute, wool, and other fibers, machine for preparing, A. T. Lawson et al, Flour or meal bin and sifter, W. H. Hammer, Flour pot machine, C. McDonald, Fly book, J. S. Benn, Folding chair, H. Miller, Folding chair, C. H. Orcutt, Foot warmer, W. A. Randle, Frog, life and property saving derailing, Bodley & Frutiger, Fruit gatherer, C. R. Banks, Fruit packer, W. A. Trescott, Furnaces, injector oil burner for boiler, J. H. Jones, Gauge, water, G. W. Sully, Game puzzle, C. P. Harris, Gas apparatus for the manufacture of, L. Stevens, Gas engine and ignitor therefor, G. J. Weber, Gas scrubber, rotary, W. Mooney, Gate, H. A. Aylworth, Gate, D. Mayfield, Gate brace, S. P. Hodgen, Glass blowing tube, A. Pitman, Grain drill, Clinton & Kirkpatrick, Grinding machine, A. B. Landis, Grinding mill roller, W. D. Gray, Hand or foot water, J. T. Mills, Harness, D. B. Smith, Harness, horse training, J. H. Whitaker, Harness rosette, E. F. Pinner, Harrow, spring tooth, H. V. Miller, Hat, W. W. Hall, Hat packing ring, F. P. Ferry, Hearth cabinet, S. G. Smith, Heel burnishing machine, W. F. Sampson, Hitching post, A. E. Fehleisen, Hoe, L. Denny, Hoop trap and grate, combined, J. W. Wade, Hoisting apparatus, R. P. Henry, Holdback for vehicle poles, H. W. Roberts, Holder, See Lead or crayon holder, Pen holder, Spool holder, Hook, See Checkrein hook, Hooks, device for holding, J. J. Harris, Ironing machine, sewing, J. Laird, Hub, A. F. Shuler, Hydrant, T. W. Brooks, Hydrant valve, J. E. Callahan, Ice water receptacle, H. Paddock, Indicator, See Car indicator, Piston travel indicator, Ingots, forming, W. R. Hinsdale, Ink well, W. A. Miller.