Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

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 do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

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.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

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(1) P. J. asks: How shall I construct a furnace so that in evaporating cane juice the pan will boil all the way alike? In the last stage, the fire being diminished, I have to stir from back to front, which darkens the sirup. Will corrugating the after end do, or a bath of whale oil, as this oil will maintain a heat of 600° without boiling? If this or any other liquid will do we then can get the fire surface. A You might use as an equalizing bath a concentrated solution of calcium chloride or zinc chloride. The corrugations proposed would not help the matter.

(2) J. A. L. asks: Is there any substitute for quicklime in the oxyhydrogen light which will be more permanent and less fragile? A. A clear, well-burned magnesian lime, prepared from dolomite, is better than ordinary lime. There is no better substitute that we know of.

(3) T. H. C. writes: 1. The SCIENTIFIC AMERICAN some time ago contained a reference to "Spence's" or "Spencer's" metal, a compound of sulphur with something else. Can you refer me to it, or describe it for me in your Notes and Queries? A. See answer to E. A. C., this page. 2. Do you know anything respecting the nature of tripolith, so called? A. No. You should address the manufacturers.

(4) S. S. Mfg. Co. ask: Will you please oblige us, through the medium of your valuable paper, with a recipe for making draughtsmen's sensitive paper for copying blue prints? It is extensively used by railroad companies for duplicating, and is a similar process to that used by photographers. A. Ammonia citrate of iron, 40 grains; distilled water, 1 oz.; dissolve and spread over the paper with a flat brush or glass rod. After drying (in the dark) expose to light under the negative. Develop by spreading over the paper the following solution: ferrocyanide of potassium, 1 drachm; water, 1 ounce. Rinse the developed blue print in plenty of soft water. To prevent fading, wash the print in a weak aqueous solution of ammonium carbonate (which will turn the color to a lavender hue), then wash in water and dry, when the blue color will be restored.

(5) J. D. B. asks: Is there a phosphorescent paint or wash that is of practical use in lighting, or that will assist in lighting a mill by night; and if so, how can it be made? A For direction for preparing phosphorescent paint, see page 53, last volume. These paints are hardly of sufficient luminosity to aid much in illuminating apartments. 2. Also, is there anything I can use on pine framework of a barn that will prevent horses from eating it? If so, what? A. Have you tried a thick lime wash?

(6) H. B. asks how to make a solution for silver plating—a solution that will deposit the silver in a polished state. A. See Stereotyping and Electrotyping, Electrometallurgy, in SUPPLEMENT, No. 310. 2. What is the best battery to use for the purpose? A. A bichromate cell is preferable. 3. Will a six-inch Grenet cell do? If not, why? A. If the work is quite small the Grenet cell may answer, but a larger cell would be better. 4. I have a bobbin, six inches in length, out of which I intend making an induction coil, but am in doubt as to what quantity of thick wire to use. A person told me that it was necessary to have an equal amount in weight of thick and fine wire. Is this true? A. No. 5. What number of fine wire is best to use for the purpose? A. No. 36. 6. On what does the power of the coil depend: on the number of feet of thick wire, number of feet of fine wire, or the thickness of the fine wire? A. On all, and upon an appropriate battery current. See *Induction Coils*, SUPPLEMENT, No. 160.

(7) E. A. C. asks: 1. Can you give me information in regard to the composition known as "Spence metal," of recent discovery and origin? Can it be procured in quantities. How can I get a specimen? A. See "Spence Metal," in SUPPLEMENT, No. 222. The metal is what may be called an alloy of sulphur and certain metallic sulphides—as iron sulphide. 2. Why is not aluminum produced cheaply for use in the mechanic arts? A. If the demand for aluminum were greater the cost of manufacturing it could be very considerably reduced. The cost is directly due to the high price of the metal sodium used in its reduction. 3. Is there any other metal of a very light specific gravity, say as light as aluminum or lighter, and with qualities, say, like lead and similar metals as to hardness and fusibility? A. We know of no such metal or alloy.

(8) J. L. writes: Would the developer, described in SCIENTIFIC AMERICAN of May 7, 1881, in answer to S. B. D., work without the addition of nitrate of silver? As the formula given by W. D. Richmond, SCIENTIFIC AMERICAN SUPPLEMENT, No. 226, shows that all of the $AgNO_3$ is converted into AgBr. I do not understand how development takes place. Please explain, showing reactions. A. The addition of silver was not recommended, and is not require.1. For the reaction of the iron developer consult any good work on the chemistry of photography.

(9) C. K. asks: Will you tell a number of us how thermometer tubes are graduated? A friend ordered a box of them. There were no two alike; all were of the same length. A. In the graduation of thermometers two points on the tube are first determined (after the instrument is filled and sealed properly), one to register the height of the column of mercury after fifteen minutes' exposure in pounded ice; the other the height of the column when the tube is exposed to steam at the atmospheric pressure (760 millimeters barometer). The space between these is then marked off into a certain number of equal degrees, according to the kind of scale to be used. Thus for the Fahrenheit scale the space would be divided into 180 parts or degrees, and the division continued downward beyond the lower mark, 32°, thus making 212 divisions in all—the lowest being zero on this scale, and the highest 212°, while the 32d division from the bottom registers the freezing point of water. In the Celsius or centigrade scale the space between the freezing and boiling points is divided into 100 parts or degrees, while in the Reaumur scale the same space is divided into 80°—the zero mark in these scales corresponding to the freezing point (32°) on the Fahrenheit scale.

(10) W. M. M. asks: Is there any difference of water level at the Isthmus of Panama, between the Pacific Ocean and the Caribbean Sea? A. There is no absolute level; but, since the tides are much greater on the eastern side of the Isthmus, the water level at high tide on that side is several feet above high water level on the western side.

(11) F. H. G. asks: How can I make a solution for copper plating? A. See Electrometallurgy and Copper Deposits, in SUPPLEMENT, No. 310. 2. How to make the best razor strop paste? A. Levigated tin oxide (putty powder), 1 ounce; powdered oxalic acid, ¼ ounce; powdered gum, 20 grains; make into a stiff paste with water, and evenly and thinly spread it over the strop. Or, emery flour (finest), 2 parts; spermaceti ointment, 1 part; mix together and rub it over the strop. Or, jeweler's rouge, blacklead, and suet, equal parts.

(12) E. M. H. asks: 1. What can I use for packing the plunger of a lead pump for oil of vitriol? Rubber will not stand. A. Try asbestos packing. See our advertising columns for addresses of dealers. 2. Theoretically a small cell of battery should give the same electromotive force as a large one. I find a vast difference in favor of the large cell, in work actually performed on a motor. How is this? A. The internal resistance of a large cell is less than that of a small cell of the same type, and, as ordinarily constructed, the relative volume of liquid to active metal surface is greater, consequently the conditions of maximum current are longer maintained in the larger than in the smaller cell.

(13) W. T., Jr., asks: Has there been any means invented to successfully prevent the reuse of canceled postage stamps? A. No.

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

S. B.—It consists chiefly of copper and iron sulphide and carbonates, probably carrying silver. If the sample is representative of the body of ore, the property is likely to prove a valuable one.—R. J. C.—It is a piece of burnt iron or steel—of artificial origin.—M. A.—It is impure phosphocalcite—a native phosphate of copper.

COMMUNICATIONS RECEIVED.

On German Hygienic and Life-saving Exhibition.

On a Rainbow. By J. B. D.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

December 6, 1881.

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Acid, manufacture of sulphhuric, Benker & Lasne 250,416
Adding machine, W. M. Howland 250,541
Aerial navigation and machinery for propelling the same, vessel for, A. L. Blackman 250,417
Air, apparatus for purifying vitiated, R. Neale 250,568
Alarm. See Low water alarm.
Annunciator for telephone signals, J. B. Odell 250,384
Apple corer, P. M. Ackerman 250,474
Aspersorium, P. Schneider 250,398
Axle box, car, J. Hooley 250,538
Axle lubricator, car, G. F. Godley 250,522
Baling press. P. K. Dederick (r) 9,956
Ball. See Tube welding ball.
Bar. See Harvester finger bar.
Battery. See Galvanic battery.
Bedstead, sofa, H. R. Plimpton 250,453
Beer cooler, C. Zimmer 250,471
Belt tightener, J. F. Wilson 250,617
Berry crate, C. D. Chapman 250,341, 250,342
Bird cage, O. W. Taft 250,600
Board. See Bosom board.
Boiler. See Range boiler. Steam boiler.
Bolt threading machine, L. W. Stockwell 250,459
Book clasp, E. P. Hinkel 250,536
Boot and shoe burnishing and polishing machine, Newton & Gilman 250,388
Boot and shoe heels and soles, protecting plate for, L. Young 250,410
Bosom board, Everett & Quinby 250,350
Bottling machine, Lang & Breitenfeldt 250,369
Bottling machine, compound, E. G. Chewning 250,500
Box. See Axle box. Fare box. Loom shuttle box. Cigar box. Game box.
Braid roll binder, P. J. Duggan 250,428
Brake. See Sled brake. Wagon brake.
Brush, J. R. Rennous 250,577
Bucket, sap, T. B. Hayward 250,353
Buckle, G. M. Hubbard 250,542
Buckle, shoe, J. Leiboldt 250,447
Burner. See Lamp burner.
Button, detachable, B. B. Manchester 250,374
Button fastener, W. M. Hazel 250,529
Button or stud, I. R. Dunham 250,429
Camera plate holder, M. Flammang (r) 9,958
Cap, knit, C. F. Hoag 250,440
Car coupler, G. O. Bishop 250,338
Car coupling, S. T. & S. D. Autey, Jr. 250,480
Car coupling, C. L. Cloutman 250,629
Car coupling, R. Jones 250,366
Car couplings, draw bar attachment for, I. S. McGehan 250,563
Car curtain, flexible, H. N. E. Cottier 250,345
Car, dumping, G. E. Boyden 250,420
Car replacer, S. R. Owen 250,633
Car seat, G. B. St. John 250,597
Car, stock, S. P. Tallman 250,461
Car wheel, A. D. Canfield 250,496
Car wheels, manufacture of, Z. S. & L. W. Washburn 250,497
Card, thread, A. Engisch *et al.* 250,430
Carpet and oil cloth fastener, J. A. Cole 250,344
Carriage spring J. F. Shaw 250,399
Carriage wheel, J. Raddin (r) 9,963
Cartridge capper and uncapper, J. Thistlethwaite 250,603
Case. See Writing case.
Cask or barrel, knockdown, R. F. Adams 250,475
Caster, L. M. Morehouse 250,634
Chair. See Folding chair.
Chair, J. W. H. Doubler 250,506
Chuck, lathe, J. C. Baker 250,415
Chuck, lathe, J. N. Skinner 250,400
Churn, rocking, O. Gentsch 250,521
Cigar box, S. Debriner 250,427
Clamp. See Net clamp. Spring clamp.
Clasp. See Book clasp. Yoke clasp.
Cleaner. See Grain cleaner.
Cloth cutting machine, N. B. Rafelson 250,575
Clothes pounder, A. Patterson 250,386
Clutch for hoisting apparatus, friction, D. R. Fraser 250,433
Coal and rock drilling machine, F. M. Lechner 250,370
Cock or valve, globe, P. G. Van Wie 250,405
Coffee, etc., apparatus for roasting, P. Pearson 250,571
Coffee roaster, G. W. Richmond 250,578
Collar, horse, J. Herkimer 250,355
Comb. See Currycomb.
Commode chair, T. Russell 250,396
Connecting rods, device for increasing the throw of, G. W. Golay 250,523
Cooler. See Beer cooler.
Copying pad, W. G. Morse 250,380
Coupling. See Car coupling.
Crate. See Berry crate.
Crate for vegetables, fruit, etc., O. C. Brown 250,628
Crib and cradle, folding, Wilbur & Hungerford 250,614
Crutch, H. A. Heckler 250,531
Cultivator, Evans & Draper 250,512
Cultivator, J. W. Hudson 250,361
Cultivator fender, G. W. Haviland 250,527
Cultivator shovel, J. C. Heck 250,550
Cupola and blast furnace, Thiollier & Laurent 250,602
Currycomb, J. L. Dole 250,549
Currycomb, W. E. Lawrence 250,549
Cut-off and throttle valve for steam engines, safety, J. F. Barker 250,332
Dental flask, J. R. Finney 250,513
Drawer pull, H. H. Liemke 250,371
Drill. See Rock drill.
Electric circuit wires, underground conduit for, E. A. Kitzmiller 250,548
Electric conductor, subterranean, S. Chester 250,499
Electric machines, armature for dynamo, J. B. Livingston 250,554
Elevator. See Hay elevator. Water elevator.