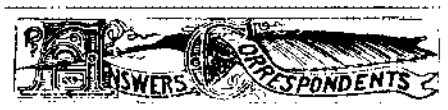

(1) C. C. asks: Is there any way to render silicate of soda insoluble, so as to resist the action of rain water? A. There is no known method for this.

(2) C. L. W. asks: What will neutralize the effect of nitric acid upon clothing? A. Aqua ammonia, if promptly applied.

Will two electro-magnets (the two unlike poles being opposite) attract each other with more force than one electro-magnet will attract a piece of iron with? A. No, if the other conditions are the same.

(3) C. D. asks: How am I to proceed to electroplate in iron? A. Use the protosulphate or neutral chloride of iron, with an iron electrode.

(4) T. B. C. asks: 1. Has a steam boiler ever been constructed so as to be heated by electricity? A. No. 2. My idea is to have coils of platinum wire traversing the boiler and attached to batteries of sufficient power to generate the heat. Is this practicable? Can sufficient heat be generated? A. Your idea is totally impracticable.

(5) W. M. asks: Can you tell me why the English telegraphs are run on the open circuit and the American on the closed circuit, and which is the most economical? A. The original telegraph in England was the Cooke and Wheatstone's needle telegraph, which was worked by reversals of the poles and necessitated the use of the open circuit, with batteries at each station. When the Morse came into use, they still adhered to the open circuit feature. In this country, the open circuit plan has been used quite extensively, and is still employed to work the duplex and quadruplex systems. The open circuit plan is the most economical.

(6) W. F. W. asks: How can I become a good practical architect? A. The best way is to serve a regular novitiate in the office of an architect of good standing, in which you will become acquainted with the requirements of the profession, and have access to his library.

(7) M. B. asks: 1. What would be the width of the torrid zone if the axis of the earth were inclined 30° instead of 23·5°? A. Sixty degrees. The sun's greatest declinations 23° 27′ 25″, and is diminishing ½ second annually. 2. We are situated at about 40° north latitude. As the sun never gets farther north than the Tropic of Cancer, why is it that the sun appears to rise north of us in the summer? A. At the summer solstice, in latitude 40°, the ecliptic meets the N. E. by E. horizon.

(8) C. H. A. asks: 1. How is the sphericity of the earth proved by the appearance of clouds on the horizon? A. Lines of true level are curved, and differ from straight sight lines of apparent level one eighth of an inch in a sight of one eighth of a mile. 2. How can it be shown by canal level? A. The dip of the horizon at sea when the hight of the eye is three feet is 1′ 42″; when the eye is elevated 17 feet, it is 4′ 3″.

(9) B. D. R. asks: 1. How many times does the strongest magnifying glass now known magnify? A. 100,000 diameters. 2. Could such a glass be used as ordinary eye glasses or spectacles? A. You can wear a pair of magnifying spectacles of about 3 inches focus. The microscope brings the object nearer to the eye than ten inches, its normal focal distance. A pin hole in a card, or a larger aperture holding a drop of Canada balsam, or a spherule melted from glass thread, illustrates this.

(10) H M. asks: When the air is perfectly dry and clear, is sound propagated farther than when moisture exists in the air? A. Yes.

(11) A. B. asks: 1. Is there any difference in the kind of electricity obtained from an electrical shocking machine, operated by a battery, and one composed of magnets which are turned by a crank? A. None. 2. Do they use a common glass plate or cylinder electrical machine for medical purposes? A. No. 3. Is a galvanic battery without any machine for shocking ever employed? I never could feel anything by simply using a battery. A. Yes; in some hospitals it is exclusively used. A battery of 100 Daniell's cells is employed. You would have got a shock if you had used a battery of a sufficient number of cells. 3. How is it that I feel a shock when I put the wires on the shocking machine, but not when I simply hold the wires from the battery without connecting with the machine? A. Because the passing of the current of low tension through the primary coil induces electricity of high tension in the secondary coil, from which you obtain the shock.

(12) S. E. S. asks: If I start from the equator and travel in a northeasterly direction, shall I finally arrive at the point from which I started? I think that if I kept any course except due east or west, I should finally reach one of the poles. A. You are right. In shaping a course, the middle latitude between two places is used to look for the difference of longitude, departure, course, and distance in the tables.

Where is the Puerco River? A. In New Mexico. It flows into the Rio Grande.

(13) E. W. asks: If I make a mark, at 1 o'clock by a correct watch, on a floor, where the shadow of the corner of a house falls, shall I have a standard to keep the watch correct by? A. The sun is right April 15, June 14, September 1, and December 24. Make a noon mark in the meridian and apply the equation of time from the *Nautical Almanac*.

(14) C. D. asks: How is asphalt pavement made? A. It is composed of broken stones, sand, and gravel, cemented together by tar, pitch, or bitumen.

How much pressure per inch is it safe to use in a boiler of two feet diameter, and 1-16 inch thick? A. About 25 lbs.

(15) B. F. asks: What is the highest temperature at which water will readily condense steam? A. At any temperature less than that of the steam, if enough water be circulated through the condenser.

(16) S. H. D. says: If you put a thermometer in an open vessel of water heated to the boiling point, it will indicate 212°. If it is in a boiler or other closed vessel, will it indicate more than 212°, provided you have heating surface enough, as in a boiler furnace? A. It can be made to give much higher indications, if the water is confined so that it can be converted into steam of greater pressure than that of the atmosphere.

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

D. W. D.—It is impure brown sesquioxide of iron.—E. M. M.—Your specimen is graphite.—J. N. —It is iron pyrites.—M. S. W.—It is sulphuret of zinc, traversed by a thin seam of pyrites.—C. I.—It is gypsum.—J. W.—It is clay, with a small percentage of oxide of iron. It would make an inferior paint. —V. W. S.—It is a very difficult thing to answer such questions as yours, when a piece of something looking like dirt and of hardly the size of a three cent piece is sent. A piece of reasonable size should be sent, with some suitable explanations. The present so-called specimen is black and green sealing wax, mixed up with nitrate of baryta.—A reader sends two specimens, in an unlabeled pasteboard box. No. 1 is a silvery looking mineral, in fan-like needles, with a greasy feeling like soapstone. It is pyrophyllite, so called because when heated it swells out to many times its original bulk, forming small leaves. It is a silicate of alumina containing water. No. 2 is quartz sand mixed up with pebbles of brown oxide of iron. Some of the latter, of a cubical shape, have arisen from the alteration of the yellow sulphide of iron to the brown oxide.

J. A. C. says, in reference to an article on spontaneous combustion in hay: Some persons distribute salt plentifully throughout their hay when they pack it away, in order to make it more palatable to the stock. Cannot the salt be also suggested as a preventive of spontaneous combustion?—S. W. asks: Is the wood of the *bois d'arc* or Osage orange tree ever used in ornamental work?—T. McI. asks: Are there any wire swing bridges?—H. R. E. asks: How are dies, for making type, cut?—G. E. asks: How do pocketbook makers make the creases in the leather of pocket books and what kind of tool is used?

COMMUNICATIONS RECEIVED.

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

On Ventilation. By C. A. W.
On Hydraulic Brakes. By W. M. H.
On the Phylloxera. By L. W. G.
On Dynamite. By H. C. R.
On Life Insurance. By B. F. R.
On a Hole through the Earth. By B. C.
On a Flying Machine. By L. M.
On the SCIENTIFIC AMERICAN. By E. G. F.
On Sun Spots and Comets. By J. W. F.
On Strange Forces in Nature. By G. W. R.
On Lacing Belts. By J. W. S.
On Cribbing in Horses. By B.
On Tempering Steel Tools. By T. D. L.
On a Cut Worm. By A. G. C.
On Phosphor Bronze. By J. A. B.

Also enquiries and answers from the following:

W. P. F.—C. E. M.—H. M. H.—S. D. G. N.—B.—R. H. F.—L. L. B.—G. E. W.—C. J. B.—W. H. 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.

Enquiries 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 enquiries analogous to the following are sent: "Where can the three cylinder engine be obtained? Whose is the best book-paging machine? Where can bookbinders' finishing tools be bought?" All such personal enquiries 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

November 17, 1874,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Addressing machine, J. M. Burkert..... 156,977
Alarm signal, electric, Z. P. Hotchkiss..... 156,002
Alphabet board and block, D. C. Taylor..... 156,959
Alphabet case, Baade & Sangster..... 156,868
Ash leach, D. J. Moffit..... 157,020
Bale tie, Allan & Burns..... 156,965
Bale tie, H. G. Hutchison..... 157,005
Bale tie, J. N. Smith..... 157,082
Barrel valve apparatus, W. H. Lamb..... 156,852
Barrels, making, I. Hogeland..... 156,926
Basket bottom, H. C. Jones..... 156,850
Bed, bureau or dressing case, M. Crosby..... 156,986
Bell, electric, Z. P. Hotchkiss..... 157,003
Bill file, H. J. Frost..... 156,884
Billiard table piano, C. A. Green..... 156,997
Billiard table leveler, T. J. M. Jewell..... 156,927
Binder, temporary, B. J. Beck..... 156,871
Binder, temporary, L. P. Keech..... 156,887
Bird cage, O. Lindemann..... 157,012
Bird cage, T. M. Worcester..... 157,056
Blind, stop, H. P. and N. C. Moffet..... 156,937
Boiler attachment, steam, N. Wiard..... 157,051
Boiler attachment, wash, J. Haskins (r)..... 6,136
Boiler, wash, L. Fairchild..... 156,844
Boom crotch supporter, A. E. Small..... 157,031
Boot heels, burnishing, H. Grover..... 156,848
Boot, button, E. F. Wells..... 156,963
Bottle covers, making, E. K. Cooley..... 156,913
Bracelet, E. F. Presbrey..... 156,858
Bracelet rings, molding, J. W. Combs..... 156,881
Brick machine, J. Armstrong..... 156,966
Bridge, truss, J. L. Miner..... 156,936
Brush, paint, E. X. Thiercelin..... 156,961
Bung and vent valve, Beins & Baltzer..... 156,971
Burner, gas, S. Hobson..... 156,925
Cam slide, Siviter & Houghtaling..... 157,029
Can tops, oil, G. H. Chinnock..... 156,877, 156,878
Car axle box, T. Haynes..... 157,000
Car axle box, G. Houlton..... 157,004
Car axle lubricator, C. D. Flynt..... 156,990
Car coupling, W. C. T. Davidson..... 156,917
Car coupling, F. Grainger..... 156,995
Car coupling, J. J. Lappin..... 156,889
Car coupling link, J. B. Stamour..... 157,035
Car roof, J. G. Thayer..... 156,896
Car stove, railroad, R. F. Rankin..... 156,944
Car trucks, guide wheel for, N. M. Hale..... 156,922
Cars, etc., loading, G. Barclay..... 156,903
Car bolster plate, P. Farwell..... 156,845
Carbon black, making, A. Farrar (r)..... 6,135
Carpet stretcher, P. B. Myers..... 157,022
Centering device, W. D. Slack..... 157,030
Chair and lounge, combined, D. Vass..... 156,042
Chair bottom, E. Savoral..... 156,028
Clamp, book, J. W. Beatty..... 156,904
Cooler, milk, H. Cowdery..... 156,915
Cop tube, L. D. Bennett..... 156,972
Corn shelling machine, H. L. Whitman..... 157,047
Cotton against moth, treating, G. W. Chipman..... 156,879
Cotton jack, M. J. Walsh..... 157,044
Crane, hoisting, G. H. Starbuck..... 157,036
Cryptography, Joseph & Aberle..... 156,851
Cultivator, T. H. Garland..... 156,847
Cultivator, Markee & Spicer..... 157,014
Cultivator, T. W. McDill (r)..... 6,137
Cultivator, hand, French & Prentice..... 156,919
Currycomb, W. E. Lawrence..... 157,010
Dental plugger, W. M. Reynolds..... 156,945
Distilling apparatus, D. G. Rush..... 156,948
Dovetails, forming, E. T. Eddy..... 156,888
Dryer, S. R. Megown..... 157,018
Drying apparatus, Harrison & Savery..... 156,849
Elevator, fireman's, J. A. Duggan..... 156,842
Engine, rotary steam, Hardy & West..... 156,998
Engines, air and steam, fire, J. B. VanDyne..... 157,041
Engine valve motion, Brandon & Trankle..... 156,907
Excavator valve, W. E. Brock..... 156,908
Explosive compound, J. W. Willard..... 157,054
Eyeleting machine, Woodward & Goodson..... 156,902
Fare register, E. P. and H. H. Loveman..... 157,013
Fire brick, etc., composition, E. H. Richter..... 156,946
Fire extinguisher, J. B. Van Dyne..... 157,400
Fire kindler, J. Commins..... 156,984
Flower stand, O. A. Bingham..... 156,905
Fruit dryer, W. H. Clarkson..... 156,911
Fruit jelly, A. D. Chase..... 156,876
Fuel, burning water for, H. T. Love..... 157,011
Furnace, supplying air to, C. Gearing..... 156,994
Furnace for steam boilers, L. Stevens..... 156,955
Furnace, hot air, H. Randall (r)..... 6,140
Furnace hydrocarbon burner, L. Stevens..... 156,956
Garter, S. Chard..... 157,910
Gas retort, W. H. Lucc..... 156,853
Grinding colters, Pedder & Abel..... 157,026
Gun barrel, J. L. Kerr..... 157,008
Gun barrel machine, W. D. Squires..... 157,034
Gun or pistol, air, H. M. Quackenbush..... 156,890
Hame, H. C. and C. H. Burr..... 156,874
Harrow, G. Palmer..... 157,024
Harrow, rotary, Murphy & Cock..... 156,938
Harvester rake, J. Miller..... 156,854
Harvester sheaf dropper, P. G. & W. O. Nichols..... 156,941
He rest, A. S. Fiske..... 156