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 the following week's issue

For Sale--One 15 H. P. double cylinder, double drum, friction horizontal hoisting engine, with boiler and fixtures. New. Address W. P. Davis, Rochester, N. Y.

"U. S." metal polish. Indianapolis. Samples free. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. 6Spindle Turret Drill Presses. A.D. Quint, Hartford, Ct. Mixing machinery. J. H. Day & Co., Cincinnati, Ohio.

For mud dredging engines. J. S. Mundy, Newark, N. J. Universal and Centrifugal Grinding Machines.

Pedrick & Ayer, Philadelphia, Pa.

For Sale—Patent 460,883, portable centering machine. Address P. O. box 118, Harrisburg, Pa.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. Screwmachines, milling machines, and drill press The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. IrvinVan Wie, Syracuse, N.Y. Crandall's patent packing for steam, water, and ammonia. See adv. next week. Crandall Packing Co., Palmyra, N. Y.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps acid blowers, filter press pumps, etc.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The hest book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins By mail, \$4; Munn & Co., publishers, 361 Broadway, N.Y.

What do you want to buy? We will send without cost to you, catalogues, price lists, and information concerning anything you wish. Paret, Willey & Co., 265 Broad way, New York.

Competent persons who desire agencies for a new popular book. of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Wanted-A master mechanic and designer to take charge of the machinery of a large iron foundry and finishing works. Address, stating experience and terms H. J., Box 773, New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway. New York. Free on application.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should

References to former articles or answers should give date of paper and page or number of question. In quirles not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

INDEX OF NOTES AND QUERIES.	
Battery fluid	
Cherry tree, infection of	
Incandescent filament soldering	
Ink, to remove	4246
Liquid, high specific gravity	
Pitch and loudness	
Stains, to remove	4264

(4246) F. C. L. asks: 1. Why does it grow colder as you go higher ? A. At higher elevations we are further removed from the heat-radiating surface of the earth, and less protected by the atmo spheric envelope of the earth. 2. Does copper wire contract and expand the same as steel wire ? A. Copper when heated from 32º Fah. to 212º expands 1-582 of its length; steel expands 1-846 its length. 3. Is there anything that will remove ink from paper so it canno be seen and not harm the paper? If so, what is it, and how applied ? A. Mix equal parts of oxalic and tartaric acid and dissolve as needed in a little water. Apply, and take up the ink and eraser with a blotter. Alcohol will remove the stains of aniline. Red ink can sometimes be removed with alcohol. 4. If a dynamo and motor were belted together and started, would the result be perpetual motion? If not, why not, and

from the atomic weights to figure the same? A. The atomic weight of sulphur is 32, the molecular weight of sulphuric acid is 98. Hence we have the proportion 32: 98:: 1: x; giving 118x = 3.0625 pounds sulphuric acid from one pound of sulphur.

(4249) J. R. M. asks whether the magesium light is yet available for burning for two of three hours, and its intensity as compared with the lime light, and its comparative cost? A. The magnesium light is used to some extent for continuou illumination in a lamp which feeds the ribbon or wire forward as rapidly as it is burned, but its action is uncertain, and it does not compare with the lime light or the electric light. As to cost, we think the expense of running such a light is considerably more than that of the lime light.

(4250) J. G. asks: 1. On how long a line will the Bell telephone receiver, described in SUP-PLEMENT, No. 142, transmit and receive articulate speech? A. Two or three miles, if the line is hung adjacent to telegraph or electric line wires. 2. Would it articulate more clearly if the magnet, bobbin, and diaphragm were increased one-half? A. We think not. 3. Has the patent expired on the above receiver ? A. No. 4. What size and kind of wire is best for a telephone line four miles in length? A. No. 12 galvanized iron or steel wire, 5. Through how many ohms resistance will a Leclanche cell ring an ordinary wood box bell? A. Fifty or more.

(4251) W. H. J. writes: Please explain the trolley system of electric street railway. The wiring is what confuses me. Why is it that the car nearest the generator does not short circuit the others? Also the method of lighting them ? A. The resistance of a motor is such as to permit it to take only the amount of current required for running it. The rest of the current goes on for distribution among the other motors. The current for lighting is taken from the circuit in the same manner.

(4252) J. H. O. says: A discussion arose ecently as to the value of a contrivance in common use as a ventilator. The same consists of a sheet of tin, usually occupying the place of a pane of glass, out of which is cut a circular hole, within which is a wheel of tin, with flanges set at an angle. The wheel revolves when a current of air passes through it. Does the wheel in any way favor ventilation? Would a hole of the same size without a wheel serve as well? A. The wheel adds nothing to the force of the draught; rather essens it. Its only value is as a diffuser. By its action the air is spread out, so that it does not become dangerous to health as a direct draught upon a person.

(4253) J. I. C.-Tin plates wholly made of American metals are at present manufactured to a limited extent in this country.

(4254) H. S. R. asks: What solution should zinc be treated with to render its surface snitable for pasting labels on? A. Clean the zinc with with caustic potash (lye) or ammonia.

(4255) G. H. H. asks: 1. Is there a solution or liquid whose specific gravity is 2.25? A. A solution of mercury iodide in potassium iodide or a solution of cadmum boro-tungstate are the best. 2. Would soluble glass be poisonous to butter if the butter were put in a package lined with the soluble glass or would it give it any bad taste ? A. It would not be poisonous, but might slightly affect its flavor where in contact with it.

(4256) W. A. H. asks: Is clay considred an ore since the discovery of aluminum? A. No. (4257) W. S. writes: I inclose a piece of the twig of a fruit tree (cherry I believe) infected with scale. Will you have the kindness to describe in answer to correspondents, the best means of eradicating the affection? A. Reply by Professor C. V. Riley : In reply to the letter of Mr. William Shackelford of The Dalles, Oregon, I will state that the insect which he sends is the San Jose scale (Aspidiotus perniciosus). This is one of the worst pests of deciduous fruit trees on the Pacific coast. Many experiments have been tried against this insect by my agents in California, with the result that the most satisfactory has been found to be a wash made as follows:

Resin	30	1b.
Caustic soda (70 per cent)	9	**
Fish oil	41	s pts.
Water to make 10	00	gals.

At twice the dilution it will be safe to apply it to foliage, but it will not then be so effective. This preparation should only be applied during winter or during the dormant period: applied in the growing season. it will cause the loss of foliage and fruit.

(4258) W. B. asks: 1. The name of the river whose bed is not land, but water, and the name of a large river north of China, which river must be some relation of Shakespeare's Othello. A. The Gulf Stream and the Amoor we suppose are therivers meant, Othello being the Moor of Venice. 2. What language is spoken in the Argentine Republic and in Brazil? A. In Brazil, Portuguese. In the Argentine Republic, Spanish is the official language, but owing to a large influx of Italians a great deal of Italian is spoken. 3. Where can I get a good book, not too expensive, on North American en tomology? A. We recommend and can supply you with the following books relating especially to the subject you refer to: " Entomology for Beginners," by Packard, price \$2. Packard's "Guide to the Study of Insects," price \$5.

nine cells 4×5 with zincs and carbons 234×5 be suitable to use in electrolysis? A. They will answer if connected in parallel. Larger cells would be better.

(4261) H. H. B. asks: 1. How many 25 volt 16 candle power lamps could I run at one time with dynamo in SUPPLEMENT, No. 600 ? A. 16. 2. Can the motor described in SUPPLEMENT. No. 641, be run as a dynamo? If so, how much power would it have? A. The motor was not made for use as a dynamo. It would, however, yield a small current if used that way, probably enough for one or two 3 candle lamps. 3. Would it work better with a Gramme or Siemens armature? A. The Gramme armature is preferable, 4. Could & light dynamo be run as a plating machine ? A. Yes. with the changes described in SUPPLEMENT, No. 793.

(4262) H. D. W. asks whether a block of charcoal made from pulverized charcoal would have the same or nearly the same capacity for absorbing and condensing gases as a similar block made from the natural wood? A. It would depend on how the dust was agglomerated. Any paste or sirup used for the pur pose would interfere unless the mass was subsequently carbonized.

(4263) H. W. L. asks: What is the composition of the substance known as "Frankfort black ' in England, and also where it is procurable in America? A. Frankfort black is a high grade of bone black. You may order it from a wholesaledealer in artists' materials.

(4264) J. G. R. asks: 1. What will take red stains from red woolen underclothing out of fine white muslin? A. By a mixture of equal parts of chloroform and ether; if this does not remove the stain, it will probably resist all other applications, though javelle water might be tried. 2. Will a ball keep its weight in a space where the air is pumped out, the same as in a space filled with air? A. Yes. 3. In pumping the air out of a space, will the pump need more force, when the air is nearly pumped out, than in the beginning? A. Yes.

(4265) C. L. R. asks: Would it be practical to run induction coil described in "Experimental Science" (Hopkins) with dry batteries? If so, how many? A. It can be done by allowing 4 cells of dry battery connected in parallel for each cell of bichromate.

(4266) G. A. B. asks: 1. What is the difference between the nitch and londness of tone? A. The pitch is determined by the number of vibrations per second, while the loudness or intensity depends on the extent of the vibrations. 2. What causes a gun barrel to become hotter shooting a blank cartridge than a loaded one? A. If the increased temperature is a fact, it must be due to difference in the rate of combustion under different pressures.

(4267) F. A. S. asks (1) how to make the solder used for connecting the filaments and leading-in wires in incandescent lamps ? A. The filaments of incandescent lamps are secured to the wires by means of electric soldering, by copper as the material for forming the connection, or by means of carbon. 2. Also some phonograph company that sell their machines? A. We understand that the phonographs are not sold, but leased.

E. A. B. asks for the table for the removal of spots and stains.-R. L. M. asks for the dimensions drawings intended for the patent office .- C. C. W. asks for the composition used by toy manufacturers in moulding dolls' heads .- N. P. H. asks for the solvent power of glycerine.-B. B. S. asks how hams are cured.-T. R. L. asks for remedy for headaches.-C. R. O'B, wants the composition for hektograph sheets.-C. W. H. wants information about indicator diagrams suitable for a beginner .- H. P. J. wants information on catechol and paramidophenol developers .- N. H. S. wants a table for doses of medicine.called a posological table.-G. M.B. says : What is the composition of common painter's putty?-P. W. S. says : Can you give me formulas for the following inks-vanadium, invisible yellow, silver and autographic ?--J. McA. asks how to bend glass tubes .- J. J. W. asks : What is the composition of fuller's earth ?-J. T. asks: Of what is glaire composed ?-E. D. W. asks : Can you give mereliable receipts for etching glass?-T. J. asks : What process is used in staining pool balls, and how are they striped ?

Answers to all of the above queries will be found in "Scientific American Cyclopedia of Receipts, Notes and Queries," to which our correspondents are referred. The advertisement of this book is printed in another column. A new circular is now ready.

Replies to Enquiries.

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

TO INVENTORS.

An experience of forty years, and the preparation of nore than one hundred thousand applications for tents at home and abroad, enable us to understand laws and practice on both continents, and to possess unequaled 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 ex-tensive 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

April 12, 1892.

AND EACH BEARING THAT DATE.

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

[See note at end of list about copies of these pate	_
Abrading and finishing tool, S. Ross, Jr	72,823 72,912
Alkalies, making aluminates of, E. Fleischer	72,668
Alkalies, making aluminates of, E. Fleischer	72,651
Animal trap, T. W. Blackerby	72,852
Animal trap, R. L. Lewis.	72,733
Animal trap, G. Potter.	72,814
Animal trap, G. Winkler.	472,687
Ash or garbage receptacle, W. L. Fergus	172,667
Axle, R. E. Lehmann.	172,762
Axle, W. M. Rankin.	172,587
Axle alarm, hot, A. Backhaus	72,688
Axle vehicle, W. J. Miller <i>et al.</i>	72,545
Baking pan, Pickett & Neill	472,811
Baking pan, W. Wachs Baling press, H. L. Whitman Balling machine, G. L. Torrance	472,595 472,838 472,774 472,774
Barrow wheel, C. A. Cubbage	472,570 472,564 472,589
Beds, crib attachment for, G. D. Walker	472,647
Bedstead, folding, W. D. Snyder	472,558
Beehive, G. H. Bynum	472,726
Belt tightener, W. D. Tyler.	472,967
Belting, rubber, C. A. Clark.	472,601
Bi cycle, W. H. De Witt	472,528
Bicycle, J. D. Moskowitz	472,796
Bicycles, oil cup for, T. Wheatley	472,837
Bill holder, H. H. Hoffmann	472,576
Blind fastener, T. Corscaden Blind, window, H. B. Swartz Block. See Interlocking block.	472,635 472,592
Blotter for use in bankbooks, etc., attachable, C. Davis. Board. See Game board. Piano sounding board. Telephone exchange switchboard. Boat. See Torpedo boat.	472,700
Boats, cabin roof and deck for, G. Hurson Boller. See Steam boiler. Tubular boiler. Water	472,884
tube boiler.	472,957
Boilers, machine for heading water, W. S. Shipe	472,889
Bomb lance, D. Kelleher	472,741
Book leaf holder, J. R. & J. Ferguson	472,571
Bookmark, C. L. Watson	472,632
Boring tool. M. C. Johnson	472,541
tube boiler. Boilers, machine for heading water, W. S. Shipe Bomb lance, D. Kelleher Book check, E. North Book cafeck, E. North Bookmark, C. L. Watson. Boring tool. M. C. Johnson. Bottle stopper, W. J. Kolts Box. See Journal box. Knockdown hox. Letter hox. Powder box. Box or basket, E. Behne Brace. See Carving brace. Fence post brace. Bracet, See Electric heater bracket. Shingling bracket.	472,761 472,849
Brace. See Carving brace. Fence post brace. Bracket. See Electric heater bracket. Shingling bracket.	101010
bracket. Brake. See Car brake. Vehicle brake. Breweries, cooling room for, C. D. Stanford Brick kin, continuous, W. Johnson Brick kin furnace, W. H. Martin Brick machine, repressing, Frey & Thompson Brick machine, repressing, Frey & Thompson Brick machine, repressing, W. Griffith Bromine, extracting, H. H. Dow (r) Button M. Apfelbaum.	472,936 472,926
Brick machine, repressing, Frey & Thompson	472,618
Bricks, device for conveying, W. Griffith	472,922
Bro mine, extracting, H. H. Dow (r)	11,232
Butter moulding or shaping machine, W. Foster.	472,921
Button, M. Apfelbaum	472,845
Button, sleeve, W. E. Cook	472,941
Can filling machine, G. L. Merrell	472,583
Can diles, ornamenting, T. V. Forster	472,945
Canister, G. E. Knight	472,892
Canisters, label holder for, H. Macarthy	472,794
Car brake, C. Fries et al	472,965
Car brake, A. P. Massey	472,929
Car brake shoe, G. Sands	472,935
Car brake, street, Wood & Fowler	472,597
Car coupling, J. B. Carpenter	472,857
Car coupling, R. L. Garpick	472,534
Car coupling, C. Gates.	472,871
Car coupling, G. A. Haslup.	472,877
Car coupling, A. C. Martin	472,582
hr cks, device for conveying, w. Grimta. Bromine, extracting, H. H. Dow (r). Button, M. Apfelbaum. Button, M. Apfelbaum. Button, sleeve, W. E. Cook. Cabe rack, W. M. Goodridge. Can illing machine, G. L. Merrell. Canisters, Isbel holder for, H. Macarthy. Car brake, C. Fries et al. Car brake, A. P. Massey. Car brake, Street, Wood & Fowler. Car coupling, J. B. Carpenter. Car coupling, R. L. Garlick. Car coupling, G. A. Haslup. Car coupling, G. Gates. Car coupling, G. C. Martin. Car coupling, G. C. Martin. Car coupling, G. J. B. Smith Car coupling, S. D. Smith Car coupling, Carson & Gurganus. Car door, street, F. Mansfield Car duor, street, F. Mansfield. Car duor, street, J. Alingham. Car baster, and the cohran. Car baster, and steam coupling for railway, J. F. Till. Cars, motor for propelling, W. D. Davis. Carson Carson Carson Car baster and steam coupling for railway, J. F. Till. Cars, motor for propelling, W. D. Davis. Carson Carson Carson Carson Carson Carson Carson Carson Car baster Carson Car baster Carson Car baster Carson Car baster Carson Car baster Carson Car baster Carson Carson Carson Car baster Carson Car baster	472,958 472,840
McKeen	472,627
Car door, Carson & Gurganus	472,858
Car door, street, F. Mansfield	472,737
Car heater, street, J. Allingham	472,778
Car heating apparatus, W. C. Baker	472,689
Car heating apparatus, W. C. Baker	472,727
Car wheel, anti-friction, J. D. Farquher Cars, air and steam coupling for railway, J. F. Hill	472,944 472,807
Cars, air and steam coupling for railway, J. F. Till Cars, motor for propelling, W. L. Davis Cars, under-trussing for railway, F. E. Canda Carding machines, F. Bradbury Carding machines, condenser for wool, J. E. McWilliam Carrier, See Cash carrier. Trolley carrier. Carving brace, A. C. Peck Cash carrier, C. R. Herrington Cash carrier,	472,854 472,653
McWilliam. Carriage, baby, D. Rees Carrier. See Cash carrier. Trolley carrier.	472,740 472,714
Cash carrier, C. R. Herrington.	472,924
Cash till recorder, W. W. Darbee	472,860
Cattle guard, P. Merrill.	472,897
Chain, drive, W. L. Sykes.	472,563
Chair. See Folding chair. Window chair.	472,593
Chalk line holder, A. Tache.	472,896
Chark line holder, A. Tache. Chark line holder, A. Tache. Check, draught, or other money order or instru- ment, W. T. Doremus. Churn and butter worker, combined, E. Silen Clamp, See Plow handle clamp. Trolley wire	472,864 472,830
Clamp. See Plow handle clamp. Trolley wire clamp. Clock, calendar, Martindale & Malmborg Clod grusher, W. Rapp.	472,952 472,770
Cloth cutting machine, H. G. Rogowski	472,715
Clover huller frame, J. N. Kailor	472,792
Clutch, friction, J. R. Morgan	472,739
Clamp. Clock, calendar, Martindale & Malmborg Clock calendar, Martindale & Malmborg Cloth cutting machine, H. G. Rogowski Clover buller frame, J. N. Kailor. Clutch, friction, J. R. Morgan. Cock cylinder drain, R. P. Capwell. Coke, making, F. J. Jones. Collar, breast, J. W. Eggleston Comb. See Curry comb. Coop, J. B. Cooper Copying and recording apparatus, autographic, A.L. Peirce Copying presses, blotter bath for, F. F. Osborne Corn chaff or cellulose, machine for cleaning, T. J. Reed	472,621 472,866
Coopy J. B. Cooper Copying and recording apparatus, autographic, A. L. Peirce.	472,615 472,743
Corn chaff or cellulose, machine for cleaning, T.	472,548
J. Reed	472,613
Corret, S. Meier. Corret, S. Meier. Cotton to gins, apparatus for elevating, distribut- ing, and feeding seed, S. D. Murray. Counter protector, C. A. Schults. Counting. See Car coupling. Vehicle spring coupling.	472,931 472,607 472,771
Counfier protector, C. A. Schults	472,707
Crusher, SeqClod crusher.	472,527
Culnary article, M. J. Denison	472,734
Cultivator, L E Ponton	472,813
Cultivator, wheel, F. Bateman	472,781
Curry comb, Burnett & Sweeney	472,521
Curry comb, A. C. Bulofson	472,550
Curtain fixture, H. M. Sweeney Cutter. See Hog nose cutter. Moulding cutter. Decorticating rhea, etc., machine for, Longmore	472,832
& Watson. Dental engine, W. W. Williamson Dental engine shafts and hand pieces, coupling for, J. T. Pedersen. Dental mallet, W. E. Wells.	472,600
Dental mallet, W. E. Wells	472,68

how long would they run? A. The power required to run a dynamo is always greater than that developed by a motor driven by the current, consequently such an arrangement as you propose would not run at all. 5. Which is the cheapest-cable or electric railroad ? A. Taking the cost of construction and maintenance together, we think there is little difference.

(4247) A. M. asks: 1. Will you kindly inform me, through your paper, regarding the follow ing? What is the best compound to use with three Fuller compound batteries, and will they be sufficient to light a three candle power incandescent light (or must I have four) with thirty feet feet No. 18 copper wire? A. The formula for the solution is as follows: Bichromate of sodium is aissolved in water to saturation; to this solution slowly add one-fifth of its weight of commercial sulphuric acid. Three cells of Fuller battery will hardly be sufficient; use four or five. 2. How can l light a gas jet entirely by electricity, and what amount of E. M. F. will be needed? A. For information on electric gas lighters we refer you to SUPPLEMENT, Nos. 213 and 446.

(4248) F. E. F. writes: How much H₂SO₄=sulphuric acid theoretically can be produced

(4259) W. N. asks: Can common stove pipe be used instead of Russian iron in making a mo tor? A. Yes.

(4260) R. H. P. asks: 1. Can you tell me of any process by which India ink marks may be removed from the person without injury or a scar? А. India ink being composed of finely divided particles of carbon cannot be removed by any chemical means. Try a piece of pumice stone. 2. I wish to construct a plunge battery of nine cells, connecting five cells together and have the other four so I can turn them on one at a time. A. You will find description of plunge from one pound of sulphur? Can you give mea formula | batteries in SUPPLEMENT, Nos. 157 and 792. 3. Would | come to the ground in the same time,

(4205) H. D. H. writes: Your reply to question No. 4205, in your paper of March 26, seems a little behind the times, being based upon the law of Newtou, which law only holds true of bodies falling in vacuum. On page 303 of the Smithsonian report for 1889 you will find given, from F. H. Wenham, June, 1866, the fall of bodies in air to be "limited by the weight of air set in motion in a given time." Professor Langley, in his researches in aerodynamics, SCIENTIFIC AMERICAN, February 13, 1892, proves that a body in motion displaces a body of air equal to its greatest diameter transverse to the line of motion, multiplied by the distance traveled in a given time. Accordingly take a cannon ball weighing one pound, and three inches in diameter, falling say fifteen feet in one second in a perpendicular line, and the same ball when projected 1.000 feet per second. In its vertical fall it overcomes a weight of air equal to the area of its greatest circle, about seven inches, by the distance it falls, fifteen feet, equal to 1,260 cubic inches, but when projected horizontally must overcome the weight of three inches. multiplied by one thousand feet, multiplied hy fifteen feet, equal to 6,480,000 cubic inches of air, to come to the ground in the same time and as the impulse projecting it acts only horizontally, it is impossible for it to