

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.

"T. New, 32 John St. New York, has sold and applied over fifty million feet of his Prepared Roofing, the major part being placed upon manufacturing establishments."

Agents Wanted.—None but intelligent and energetic need apply. Must furnish good recommendations, or no notice will be taken of applications.

Wanted—Iron Planer, about 40 inches square by 12 feet long, new or second-hand, at once. Send cuts and cash price to Bentel, Margedant & Co., Hamilton, Ohio.

Wanted—A live Salesman; a practical Sawyer and Machinist; one who can give unquestioned references as to character, habits, and ability; one acquainted with the Southwest preferred.

Wanted—The address of all principal Glass Bottle and Jar Manufacturers in the United States and Canada.

Lehigh Valley Emery and Corundum Wheels are free cutting, durable, and safe. Can be adapted to all kinds of work.

Kochendoerfer & Urie, General Brokers, 200 Broadway, will attend to any business in New York for you.

Two Second-hand large Wood Planers for sale by Wm. M. Hawes, Fall River, Mass.

Pure Water furnished Cities, Paper Mills, Laundries, Steam Boilers, etc., by the Multifold System of the Newark Filtering Co., 177 Commerce St., Newark, N. J.

Jas. F. Hotchkiss, 84 John St., N. Y.: Send me your free book entitled "How to Keep Boilers Clean," containing useful information for steam users & engineers.

Steel Stamps and Pattern Letters. The best made. J. F. W. Dorman, 21 German St., Baltimore. Catalogue free.

Now Ready. Catalogue of Electrical Books; also general catalogue. E. & F. N. Spon, 446 Broome St., N. Y.

Abbe Bolt Forging Machines and Palmer Power Hammers a specialty. S. C. Forsaith & Co., Manchester, N. H.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 138 Center St., N. Y.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J. Combination Roll and Rubber Co., 27 Barclay St., N. Y.

Send for Pamphlet of Compilation of Tests of Turbine Water Wheels. Barber, Keiser & Co., Allentown, Pa.

Presses & Dies (fruit cans) Ayar Mach. Wks., Salem, N. J. Latest Improved Diamond Drills. Send for circular to M. C. Bullock, 80 to 88 Market St., Chicago, Ill.

Wood Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free.

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

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, Limited, Erie, Pa.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

List 27.—Description of 3,000 new and second-hand Machines, now ready for distribution. Send stamp for same. S. C. Forsaith & Co., Manchester, N. H., and N. Y. city.

Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y.

Gould & Eberhardt's Machinists' Tools. See adv., p. 233. Saw Mill Machinery. Stearns Mfg. Co. See p. 221.

Supplee Steam Engine. See adv. p. 221. C. B. Rogers & Co., Norwich, Conn. Wood Working Machinery of every kind. See adv., page 206.

Cope & Maxwell Mfg Co.'s Pump adv., page 204. The Sweetland Chuck. See illus. adv., p. 206.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J.

Electric Lights.—Thomson Houston System of the Arc type. Estimates given and contracts made. 631 Arch, Phil.

For the Garden and Farm.—A great variety of Seeds and Implements. Send for catalogue. Address R. H. Allen & Co., P. O. Box 376, New York city.

See Bentel, Margedant & Co.'s adv., page 237. Pure Nickel Anodes and Salts, pure Turkey Emery, Star Fine. Greene, Tweed & Co., 118 Chambers St., N. Y.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Engines, 10 to 50 H. P., \$250 to \$500. See adv., p. 236. The Berryman Feed Water Heater and Purifier and Feed Pump. I. B. Davis' Patent. See illus. adv., p. 237.

Telegraph, Telephone, Elec. Light Supplies. See p. 238. 50,000 Sawyers wanted. Your full address for Emerson's Hand Book of Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa.

Peerless Colors for Mortar. French, Richards & Co., 410 (allow) St., Philadelphia, Pa.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 237. Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. L. S. Graves & Son, Rochester, N. Y.

Cotton Belting, Rubber Belting, Leather Belting, and all kinds of Steam Packing. Greene, Tweed & Co., N. Y. The Medart Pat. Wrought Rim Pulley. See adv., p. 236.

For Heavy Punches, etc., see illustrated advertisement of Hillis & Jones, on page 205. Centrifugal Pumps, 100 to 35,000 gals. per min. See p. 205.

Diamond Planers. J. Dickinson, 61 Nassau St., N. Y. Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 238. 4 to 40 H. P. Steam Engines. See adv. p. 238. Sewing Machines and Gun Machinery in Variety. The Pratt & Whitney Co., Hartford, Conn.

For best low price Planer and Matner, and latest improved Sash, Door, and Blin Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleicher, Schumm & Co., Philadelphia, Pa. Send for circular.

The Porter-Alien High Speed Steam Engine. Southwork Foundry & Mach. Co., 430 Washington Ave., Phil. Pa. Barrel, Key, Hoghead, Stave Mach'y. See adv. p. 237.



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 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.

(1) R. D. G. asks: 1. Do they generally put even number of cogs in large wheel and odd number in the pinion or small wheel? If so, why? A. Yes; to have a "hunting" cog or tooth, so that the cogs do not constantly work on same cogs of other wheel. 2. From what points is the diameter of a bevel or miter cog wheel measured? A. From the pitch line on the back, or large diameter. 3. In a bevel cog wheel, seven inches across, to run a shaft at right angles to it just three times faster, how many cogs should there be in each wheel? Will thirty in large and ten in small wheel be right? A. Yes.

(2) J. F. M. asks: 1. Is there any way to make water flow over a bank without suction or pump? A. Yes, if the bank is not too high. Use a siphon. 2. Can refuse tin—the waste in tin shops—be melted cheaply? A. No.

(3) S. W. & W. ask: What is the probable difficulty—our 12x18 new engine does not give us the power it should in proportion to the smaller engine it replaced. Engine runs 150 revolutions, and boiler furnishes plenty of steam. Engine is fed by a 2 inch pipe, 28 feet long, through a 2 inch safety valve, throttle, and Judson governor, and the steam passes through four right angles, between boiler and steam chest. Is the pipe too small? If so, what size should we use, and what would be the gain of power? A. Your steam pipe is too small. It should not be less than 3 inches diameter. Probably the openings to the cylinder are too small also.

(4) G. K. asks the difference between a high pressure boiler and a low pressure. A. The general design and arrangement may be the same, but in a high pressure boiler the strength is increased in proportion to the pressure of steam to be carried.

(5) N. C. R. asks: In putting in a brace in the frame of a building, which would be the stronger, or rather, which would make the frame stronger, a brace of, say, 2x6, placed edgewise or flat? And which way is the usual manner of putting in such a brace? A. The usual and proper way is to put the greatest width vertically.

(6) C. de P. F. writes: In using some portable agricultural machinery, where it would be next to impossible to use a counter shaft, we run from a 60 inch pulley to a 20 inch, and our belt (a rubber one, it being in the weather) slips very much. Chalk has no effect, and we ruined one belt by using rosin, and I think also molasses and rosin. Both pulleys are iron turned, high in center, and the engine making as much speed as is considered safe by maker, while a few extra revolutions make it shake so as to frighten our engineer. I had thought that small pulley might be covered with leather, but no one near our place seems to know how to do it, and our engineer thinks the leather would tear off. A. Covering the small pulley with leather would help matters temporarily, but we could not advise it. It is evident your belt is too narrow for its work. The permanent cure is to get new pulleys, at least 50 per cent wider, and your belts will drive better and wear longer.

(7) J. W. G. writes: Our grate bars are within a foot of the bottom of the boilers. Would we save any fuel by lowering them? A. Yes; it should be 24 inches to 30 inches, according to size of boiler. 2. We burn slack, soft coal. Would it be any advantage to admit air behind the bridge wall or over the fire to consume the carbonic oxide gases, and if so, would it be of any advantage to heat this air and force it in with a fan, providing the heat did not cost anything? A. Yes; air introduced either way would be advantageous. There is no need of heating the air. A blower must be used with judgment, or else too much air will be sent in. 3. Is it an advantage or otherwise to wet slack

before throwing it on the fire? A. If a "caking" coal, dampen it; otherwise no.

(8) H. K. B. writes: The establishment to which I am attached use ordinarily bituminous coal for firing for engine for production of steam and power. They have been induced to use coke lately. Is there extra danger of burning or overheating boiler plates from use of such fuel? A. No; unless the fire be driven excessively. By enlarging your grate (if necessary) and reducing the draught, you can reduce the temperature in the furnace as you please.

(9) N. F. H. writes: I have speeded my engine up from 80 to 100 revolutions; my governor is marked 72 revolutions, now it runs 83. Should the governor still run at 72? I have trouble with my engine running too fast when doing no work. A. If you wish to run at 100 revolutions per minute, your governor should be adjusted to regulate the engine at that speed.

(10) S. F. asks: Which is best, a threaded or screw stay bolt screwed into the inside and outside sheets of the fire box of a locomotive or tubular boiler, and cold riveted at both ends of the stay, or a plain bolt without threads, riveted hot at both ends, with a thimble of wrought iron intervening between the inner and outer sheets? A. The last named, called usually socket bolts, when of equal diameter, are preferable to the screw stay. The former are, however, almost universally used on locomotives because they are more conveniently put in; but their inferior strength is compensated for by additional numbers.

(11) G. A. F. asks: Is expense the essential preventative to water being reduced to its constituents, oxygen and hydrogen, sufficient to furnish fuel in place of wood or coal? A. Yes.

(12) D. McF. asks: When sign painters letter on muslin or canvas, how do they mix or prepare their paint? The common method of mixing the paint with linseed oil, turpentine, and japan will not answer, as either of the named liquids will "spread" badly on the cloth, and a smooth even edge cannot be obtained. A. Oil and turpentine paints are used. To prevent the spreading of the paints give the cloth a coating of thin glue size, and let it dry before applying the paints.

NEW BOOKS AND PUBLICATIONS.

SPONS' ENCYCLOPEDIA OF THE INDUSTRIAL ARTS, MANUFACTURES, AND COMMERCIAL PRODUCTS. New York: F. & N. Spon. In parts, 75 cents each.

Parts 26, 27, 28, and 29, just received, contain articles on printing and engraving, resinous and gummy substances, rope and rope making, salt, silk, skins, soap, spices and condiments, starch, and sugar.

TABLES FOR THE DETERMINATION, DESCRIPTION, AND CLASSIFICATION OF MINERALS. By James C. Foye. Chicago: Jansen, McClurg & Co. 12mo, cloth, pp. 85. \$1.00.

A second edition of Professor Foye's well made little handbook for the detection and study of our principal minerals.

GEOLOGICAL SURVEY OF NEW JERSEY. ANNUAL REPORT OF THE STATE GEOLOGIST FOR 1881. Trenton: John L. Murphy, printer.

The chief features of this year's report of the New Jersey Geological Survey is an admirable geological map of the State, and an elaborate discussion of the climate of New Jersey, by Professor J. C. Smock, Assistant Geologist.

HISTORY OF THE WATER SUPPLY OF THE WORLD. By Thomas J. Bell. Cincinnati: Peter G. Thompson. 8vo, paper, pp. 134. 75 cents.

A compilation condensing in a few pages many facts and statistics with regard to the water supplies of great cities, river pollution, water purification, aqueducts, reservoirs, etc. Also much information touching the possible sources of a new water system for Cincinnati.

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending March 28, 1882.

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., 261 Broadway, corner of Warren Street, 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.

- Alarm. See Burglar alarm. Annunciator, electric, H. B. Porter..... 255,453 Attrition mill, T. L. Sturtevant..... 255,559 Ax. W. Andrews..... 255,711 Axle box, car, T. S. Phillips..... 255,451 Axle box, car, H. Roth..... 255,675 Baling machine, hay P. Wright..... 255,750 Barrel, H. Knight..... 255,433 Barrel rolling and handling machine, G. W. Stephens..... 255,546 Battery. See Galvanic battery. Bearing, anti-frictional, T. R. Ferrall..... 255,426 Bed bottom, A. H. Norton..... 255,613 Bed bottom, J. B. Frost..... 255,657 Bed frames, adjustable connection for woven wire, Ames & Frost..... 255,405 Bed, wardrobe or folding, A. W. Stewart..... 255,548 Beer cooler, C. J. Bopp..... 255,575 Belt controlling mechanism, G. H. Phelps..... 255,450

- Belt shifter, E. C. Durand..... 255,687 Belt timing machine, A. C. Krueger..... 255,638 Binder, temporary, J. R. Pitt..... 255,452 Bit. See Bridge bit. Blind, inside, J. Krebbiel..... 255,516 Blind, inside, F. Rühr..... 255,583 Blind slat holder, J. S. Thompson..... 255,699 Board. See Wash board. Hobbin, D. Hambleton..... 255,502 Boiler. See Steam boiler. Boiler, A. P. Creque..... 255,493 Boot and shoe nailing machine, W. G. Budlong..... 255,716 Boots and shoes, securing metal wearing surfaces to rubber, F. Richardson..... 255,672 Boots and shoes, wetting, Tucker & Anthonie..... 255,474 Boots or shoes, device for connecting, W. K. Webb..... 255,430 Boring machine, metal, D. W. Pedrick..... 255,449 Bottle and bottle attachment, D. Lubin..... 255,642 Bottle caps, attaching, H. Brooke..... 255,487 Bottle stopper, Houts & Ericsson..... 255,697 Bottle stopper fastener, G. F. Hoefler..... 255,586 Bottle stopper of celluloid or analogous material. S. S. Newton..... 255,655 Box. See Axle box. Bread box. Camera box. Packing box. Bracelet, C. A. Faas..... 255,610 Bracelet, I. L. Garside..... 255,614 Bracket and shelving support, F. M. Taylor..... 255,695 Brake. See Car brake. Bread box, J. Fournier, Jr..... 255,611 Bread making machine, P. F. Bryce..... 255,411 Bridge bit, H. S. Squier..... 255,737 Buckle and snap hook, combined, F. Kiekerapp..... 255,636 Buildings, construction of, A. J. Chase..... 255,595 Burglar alarm, G. P. Conant..... 255,722 Burner. See Vapor burner. Button, W. P. Dolloff..... 255,727 Button, M. Loewenthal..... 255,640 Button, D. M. J. Wall..... 255,551 Calk, E. Witham..... 255,556 Camera box, E. B. Barker..... 255,567 Capsule filling apparatus, J. Schmidt..... 255,680 Car brake, A. Bailey..... 255,482 Car brake, A. J. Kelly..... 255,431 Car brake, J. G. Schiller..... 255,539 Car brake, coal, J. A. Millholland..... 255,653 Car coupling, M. W. Bruce..... 255,586 Car coupling, L. J. Cralle..... 255,401 Car coupling, S. A. V. Hartwell..... 255,623 Car coupling, M. R. Thurber..... 255,701 Car coupling, O. F. Wood..... 255,748 Car coupling attachment, T. C. Steward..... 255,547 Car door, freight, McNally & Glasgow..... 255,598 Car, hand, H. H. Sessions..... 255,684 Car heater, J. E. Steger..... 255,690 Car mover, J. D. Lawrence..... 255,639 Car propeller, H. E. Depp..... 255,496 Carding engine feeding device, J. T. Lemaire..... 255,519 Carriage wrench, Kinsman & Merrill..... 255,637 Carrier. See Trace carrier. Cartridge, T. Shaw..... 255,542 Case. See Egg case. Organ case. Show case. Cash box system, automatic, J. C. Martin..... 255,535 Causticizing apparatus, E. T. Brenot..... 255,532 Centrifugal machine, W. Shears..... 255,685 Chandelier hanger, adjustable, M. & J. K. McCahill..... 255,442 Check, bank, E. S. Loomis..... 255,641 Chopper. See Cotton chopper. Chuck, watchmaker's, J. Spiekerman..... 255,470 Churn dasher, D. E. Davis..... 255,604 Cigarette machine, F. S. Bartram..... 255,568 Clamp. See Hose clamp. Clasp, D. F. Hale..... 255,620 Cleaner. See Cotton cleaner. Slate cleaner. Clip for holding books open, M. Stedwell..... 255,545 Clothes hanger, T. L. Wiswell..... 255,746 Clutch, friction, Blessing & Osgood..... 255,408 Coffee and spice mill, T. A. Andrews..... 255,559 Coffee, apparatus for cooling roasted, L. A. Ullrich..... 255,477 Coffee pot, M. Thomas..... 255,697 Coiler for railway heads, carding machines, etc. R. Tatham..... 255,473 Cooking vessel and condenser, combined, S. S. Whitmore..... 255,743 Cooler. See Beer cooler. Cooler for aerated waters, A. D. Puffer..... 255,457 Coop, folding, W. S. Burroughs..... 255,458 Cornice hook or bracket, C. D. Stone..... 255,471 Corset, C. N. Chadwick..... 255,594 Cotton chopper, D. W. Masee..... 255,643 Cotton cleaner, seed, G. H. Bradley..... 255,486 Coupling. See Car coupling. Pipe coupling. Croquet stand, H. C. Chester..... 255,596 Cuff fastener, Kelsey & Shuttleworth..... 255,515 Cultivator, T. A. Purket..... 255,669 Curtain roller, spring, G. T. Betencourt..... 255,571 Cutter. See Feed cutter. Tobacco scrap cutter. Damper, stovepipe, C. W. Pierce..... 255,531 Draught equalizer, S. & W. T. Marvin..... 255,527 Drawing, spinning, and twisting apparatus, F. W. Fox..... 255,612 Drier. See Fruit drier. Drilling machine, H. Hager..... 255,618 Drive pipe and coupling for oil and other wells, L. Smith..... 255,469 Dropper. See Seed dropper. Easter egg, artificial toy or, A. A. Reeve..... 255,584 Egg case, J. L. Stevens..... 255,738 Electrical apparatus, device for connecting wires in, W. Paul..... 255,661 Elevator. See Harvester elevator. Elevator safety apparatus, self-acting, J. McCarrroll..... 255,646 Embroidering machine motor, C. Wenner..... 255,710 Extension table, J. A. Proft..... 255,454 Fabric. See Meshed or netted fabric. Fabrics, process of and apparatus for aging, T. Simpson..... 255,543 Fan, J. C. St. John..... 255,549 Fan, automatic, G. W. Overall..... 255,659 Fats and oils, apparatus for decomposing, H. Heckel..... 255,504 Feed bag for horses, F. Wheaton..... 255,740 Feed cutter, Hallock & Smith..... 255,429 Feed water heater, J. H. Turner..... 255,475 Fence, Robinson & Thompson..... 255,673 Fence bars, machine for making E. & A. G. Children..... 255,413 Fence bars, machine for making metal, T. B. Doolittle..... 255,423 Fence post, H. M. Beecher..... 255,714 Fence rosette, S. W. Martin..... 255,526 Fence wire, barbed, L. E. Evans..... 255,728 File, letter, G. V. Naupath..... 255,447 Firearm lock, E. Blew..... 255,513 Fire escape ladder, R. F. Bridewell..... 255,584 Fire extinguisher valve, A. M. Burritt..... 255,590 Fires, device for checking the draught in, J. H. Drake..... 255,424 Flag, signal, T. M. Petty..... 255,685 Flour and middlings, machine for bolting and purifying, J. Craik..... 255,419