

Notes and Queries.

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 This is for our information and not for publication.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 give date of paper and page or number of question. Inquiries 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. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. 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.

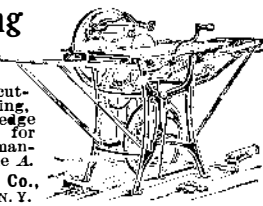
(9550) M. M. says: Will you kindly answer by letter the address of all the trade schools outside the one at First Avenue, 67th and 68th Streets, New York, which is filled? A day school where plumber's trade is taught. Please answer as soon as possible. A. The New York Trade School is the only trade school that we are certain has a day course in plumbing. We would advise you to write for catalogues, however, to Pratt Institute, Brooklyn, N. Y.; St. George's Evening Trade School, New York; McAlpin Trade School, New York; Baron de Hirsch Trade School, New York city; Highland Falls Trade School, Highland Falls, N. Y.; North End Trade School, Boston, Mass.; Charitable Mechanics' Association Trade School, Boston; Williamson Free School of Mechanical Trades, Williamson, Pa.; California School of Mechanical Arts, San Francisco, Cal.; Wilmerding's School of Industrial Arts, San Francisco, Cal.

(9551) H. J. H. says: In the physics class recently a discussion arose concerning the direction or directions in which the explosive power of dynamite is exerted. The teacher contends that the explosive force is exerted equally in all directions; the students, that the greater part of the force is exerted in a downward direction. Will you please decide which is correct? If force is exerted in a downward direction, why? Students base their contention on the fact that the textbook says: "Dynamite placed and exploded on a rock will shatter the rock." Replying to your question, we would say that your teacher is right; the force exerted by any explosive is one caused by a large volume of gas suddenly liberated, and a gaseous pressure is always exerted equally in all directions. The opinion which you hold is a very common one, which arises from not fully understanding the nature of an explosion. When a large amount of gunpowder placed on the surface of the earth is exploded, a very large volume of gas is suddenly liberated by the burning of the powder. In this case, however, the liberation of the gas is not instantaneous, and there is sufficient time for the gas to escape upward into the atmosphere before the pressure, which acts equally in all directions, is sufficient to greatly affect the surface on which the gunpowder was set off. If the powder could have been burned ten times as rapidly, the same amount of gas would have been liberated; but because it was liberated more rapidly, the pressure would have been many times greater, and sufficient in all probability to scatter the earth or rock beneath it in all directions. When dynamite is exploded, exactly the same effect takes place, excepting that in the case of dynamite, the gas is liberated almost instantaneously. In this case there is not time for the gas to escape upward before such an enormous pressure is exerted in all directions that whatever is near it, either above or below, is shattered.

(9552) J. K. says: 1. I want to make a sounding box 10 inches in diameter and 4 inches high. What material should I use, and of what thickness for top, bottom and sides? A. A sounding box may be made of any kind of wood, excepting the part which gives the resonance. This should be made of clear pine or spruce, very resonant woods. The resonant side may be from an eighth to a quarter of an inch, depending upon the kind of instrument upon which it is put. No general answer can be given. The back and belly of a violin are not usually as thick as an eighth of an inch. 2. What is meant by tensile strength? When the quantity of lumber is expressed in feet, which is meant—square or cubic feet? A. Tensile strength is the force required to pull open a wire or bar or rod of any given material, when the piece has a section of a square inch. When lumber is given in feet, the square foot or superficial foot with a thickness of one inch is understood. Thus a plank two inches thick has twice as many feet in it as a piece one inch thick. 3. Why is it that a locomotive with 1,500 or probably little more horse-power can attain a speed of 80 or 85 miles an hour, with a train of 250 or 300 tons, whereas a racing automobile with 30 horse-power and weighing about 3,500 pounds, which represents a much greater power per pound of weight moved, attains only

Wood-working Machinery

For ripping, cross-cutting, mitering, grooving, boring, scroll-sawing, edge moulding, mortising; for working wood in any manner. Send for catalogue A. The Seneca Falls M'fg Co., 695 Water St., Seneca Falls, N. Y.



ENGINE & FOOT MACHINES SHOP OUTFITS LATHES TOOLS SUPPLIES

Foot and Power and Turret Lathes, Planers, Shapers, and Drill Presses. SHEPARD LATHING CO., 31 W. 21 St. Cincinnati, O.

GIANT STEAM SHOVELS

Toledo Ohio, U.S.A. The Vulcan Iron Works Co. PALMER MARINE and STATIONARY MOTORS 2 and 4 CYCLE are no experiment, as they are in successful operation in all parts of the world. Launches in stock. Send for Catalogue. PALMER BROS., 105 Cos Cob, Conn. New York Office, 34 W. 25th St.

MOTORS We furnish castings for eight different motors, air or water-cooled. Also complete motors for all purposes. Largest Motor 100 H.P. in the World. Send two cents in stamps for our 150-page catalogue. THE HARRY R. GEER CO., 1015 Pine St., St. Louis, Mo.

If you want the best CHUCKS, buy Westcott's Little Giant Double Grip Drill Chucks, Little Giant Improved, Oneida Drill Chucks, Cutting-off Chucks, Scroll Combination Lathe Chucks, Geared Combination Lathe Chucks, Plain Universal Lathe Chucks, Independent Lathe Chucks. Made by Westcott Chuck Co., Oneida, N. Y., U. S. A. Ask for catalogue in English, French, Spanish or German. FIRST PRIZE AT COLUMBIAN EXPOSITION, 1893.

Kerosene Oil Engine Nothing but Kerosene Oil to run it. Simple, Safe and Efficient. Needs little attention, is less likely to get out of order, and is cheaper to run than any other engine manufactured. Economical and Easily Operated. International Power Vehicle Co., Stamford, Conn.

Cheap Power from Kerosene SAFE, SIMPLE, VALVELESS AND RELIABLE Universal Kerosene Engine. Automatic in operation, easily started, and runs steadily and at a comparatively high rate of speed at a cost of less than one pint of kerosene oil per actual horse power hour. Praised wherever used. Highest efficiency at lowest cost. For prices and terms address UNIVERSAL KEROSENE ENGINE CO., 137 Liberty St., New York

EVERYTHING FOR THE AUTOMOBILE YANKEE GRADE-METER Price \$7.50 Gives the grade accurately up to 40 per cent. up and down. Easily read from the seat. Yankee Mica Spark Plug Closed End, \$1.50 Open End, 1.00 Both guaranteed 90 days Mammoth Catalog for 10c. in stamps. E. J. WILLIS CO., 2 Park Place, N. Y.

THE EUREKA CLIP The most useful article ever invented for the purpose. Indispensable to Lawyers, Editors, Students, Bankers, Insurance Companies and business men generally. Book marker and paper clip. Does not mutilate the paper. Can be used repeatedly. In boxes of 10 for 25c. To be had of all booksellers, stationers and news dealers, or by mail on receipt of price. Sample card, by mail, free. Manufactured by Consolidated Safety Pin Co., Box 121, Bloomfield, N. J.

The Cushman Motor never disappoints. The least weight for the power developed makes it the Best Box and Auto Motor on the market. The New 1905 Model is better than ever. The engine proper is valveless. The cylinder, water jacket and head are cast in one piece. It is the simplest as well as the most efficient. For many speed records. Made in Single and Double Cylinder patterns. Prices make it economical. Cut shows 2 1/2 h.p. marine, weight 75 lbs. We make Auto Motors and Stationary Engines. Catalog free. Agents Wanted. CUSHMAN MOTOR CO., 2026 N Street, Lincoln, Neb., U. S. A. \$39.50 BUYS THIS We save you dealer's profits. Ship on approval 150 days free trial. Money back if not satisfactory. Send for 200 page Style Book containing 138 wonderful bargains. UNION BUGGY CO., Dept. 649 Pontiac, Mich.

The Improved Method of FINISHING FLOORS Filling Cracks with GRIPPIN'S Filler and Patching Compound. GRIPPIN MFG. CO., Dept. 6 Newark New York

Agents Wanted in every locality to represent the Keystone Fire Extinguisher. We offer attractive inducements for permanent profitable occupation. Previous experience not required. The KEystone Fire Extinguisher has been examined and approved under the standard of the National Board of Fire Underwriters. It is the CHEAPEST and BEST approved extinguisher on the market. This agency can be carried in addition to other business interests. Write to-day for full particulars. JAMES BOYD & BROTHERS 18 N. 4th St., Philadelphia Manufactures of FIRE PROTECTION EQUIPMENT Fire Hose, Hose Couplings, Hose Pipes, etc.

\$95.00 Buys our 12 or 14-ft. Fishing Launch Equipped with our celebrated 2 1/2 H.P. motors. Known over the world as the "Bull Pup." Complete catalog of engines for asking. FAIRFIELD MOTOR WORKS, Fairfield, Conn.

A 1000 years of mistakes and then the NATURO This is the only kind of sanitation that is clean, comfortable, and made in Water Closets since the year 1870. You know we are right. Write for literature. THE NATURO CO., Salem, N. J.

Protect Your Poultry For feeding and watering poultry no better device was ever invented than this clean and healthful invention. LATHROP'S LATEST IMPROVED Combination Automatic Feeding and Watering Device Clean, strong, durable. No corners or crevices. Easy to clean by a few turns of your finger. Will operate water, grain, grit and soft feed. No soldered joints, no seams, nothing to rust. Every part galvanized. Any size bottle can be used. Water can be served fresh as desired without stirring sediment in basin. Frame strips protect from filter. Dozen can drink or feed at once. Every part separate and can be removed at will. All troughs are in steps. Manufactured and for sale by THE LATHROP MFG. CO., 72 Central Ave., Rochester, N. Y.

ELECTRICAL MOTORS.—THEIR Construction at Home. SCIENTIFIC AMERICAN SUPPLEMENTS 759, 761, 767, 611. Price 9 cents each, by mail. Munn & Company, 361 Broadway, New York City, and all newsdealers.

Four-Cycle Motor Single and double cylinders. Simple and reliable. Best materials and workmanship. Not how cheap but how good. They are moderate in price. Write us. Catalogue Free. Grant-Ferris Co., Troy, N.Y.

Do You Use Chucks? If so our catalogue will interest you. Sent free. New styles. New sizes. Liberal discounts.

THE CUSHMAN CHUCK WORKS Chucks Exclusively Hartford, Conn. ORIGINAL BARNES Upright Drills Positive Feed 10 to 50-inch Swing Send for Drill Catalogue. W. F. & JNO. BARNES CO. (Established 1872) 1999 Ruby St., Rockford, Ill.

THE OBER LATHES For Turning Axe, Adze, Pick, Sledge, Hatchet, Hammer, Auger, File, Knife and Chisel Handles, Whiffletrees, Yokes, Spokes, Porch Spindles, Stair Balusters Table and Chair Legs and other irregular work. Send for Circular A The Ober Mfg. Co., 10 Bell St., Chagrin Falls, O., U.S.A.

the same speed as the locomotive does, and in some cases even smaller? A. The statement of the speed of automobiles hardly represents the latest records. However, the locomotive has the momentum of the heavy train to help it. A light weight cannot be given so great a velocity as a heavy one. A very light ball cannot be batted so far nor sent so fast as a heavy ball.

NEW BOOKS, ETC. SMALL ELECTRICAL MEASURING INSTRUMENTS. How to Make and Use Them. London: Percival Marshall & Co., N. D. 16mo.; pp. 90. Price, 20 cents. This little book will prove useful to amateurs. The diagrams are clear and the descriptions lucid.

ELECTRICITY CONTROL. By Leonard Andrews, Assoc.M.I.C.E., M.I.E. Philadelphia: J. B. Lippincott Company, 1904. 8vo.; pp. 231; 204 illustrations. This book is devoted exclusively to the systems of electric transmission and switch gear between the generators and the distributing center. Starting with the general principles of switch gear design, the author discusses its constructional details in the form of circuit breakers, alternating reversing current devices, and the arrangement of bus bars and other apparatus for parallel running. The general arrangement of controlling apparatus for both high and low tension systems is also gone into and examples of complete installations of both types are given. Long distance transmission schemes are also discussed, and the insulators, lightning arresters, etc., used on such lines are thoroughly described. Numerous half-tones and line cuts illustrate the text in a thorough manner. The book will be found most useful by electrical engineers who have to deal with this subject.

THE NAVAL CONSTRUCTOR. By G. Simpson, M.I.N.A. New York: D. Van Nostrand Company, 1904. 16mo.; pp. 588; numerous diagrams and tables. Price, \$5.

This handbook is one of the most complete works of ready reference for those engaged in ship design, construction, or maintenance that we have seen. A great deal of valuable information on most points in the theory and practice of marine architecture will be found in its pages in very concise form, while besides this there is much new matter that will be found useful, such as the chapter on design and many of the tables of standardized fitting details. The freeboard tables have all been explained and their application has been simplified by the working out of examples of the various types to which freeboards are assigned. Among these types are the modern shelter decker, rules for which have recently been issued. All obsolete matter and data have been eliminated and the book is entirely up-to-date and thoroughly practical in its character. A large number of valuable tables are contained in its latter pages.

TASCHENBUCH DER KRIEGSFLOTTEN VI. JAHRGANG 1905. Mit teilweiser Benutzung amtlichen Materials. Herausgegeben von B. Weyer, Kapitänleutnant a. D. 359 Illustrationen. München, 1905. J. F. Lehmanns. Price, \$1.50.

The stirring events in the Far East, events which are of considerable importance in naval annals because of the destruction of Russian and Japanese ships, has rendered it necessary for Capt. Weyer to revise his excellent little manual with considerable care. The book as it now stands takes into consideration the losses that have been sustained by both combatants up to December 10, 1904, and may, therefore, be considered the most thoroughly up-to-date naval manual now to be obtained. About fifty pictures and drawings have been added to this year's book, which have contributed much to the value of the work. In order to make room for these, a few unimportant chapters on signals and information relating to government officials have been dropped.

INDEX OF INVENTIONS For which Letters Patent of the United States were Issued for the Week Ending February 28, 1905 AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

Abrading implement, Edwards & Williams..	783,937
Accounts, means for entering, R. C. Williams	783,738
Acies from solutions, apparatus for the recovery of volatile, E. R. Hewitt.....	783,783
Advertising device, Reupath & Corbitt.....	783,542
Air brake, J. Riley.....	783,801
Amusement apparatus, U. Ancillotti.....	783,812
Angle Joint, J. D. Walsh.....	783,987
Armatures for dynamos with wave-winding, equipotential connections for, Arnold & Collischonn	783,495
Bag turning machine, W. H. Lester.....	783,443