

where no living being is present, or within reach of the physical disturbance, is answered in one way by the physicist, and in the opposite way by the physicist. Physicists say there is no sound where there is no auditory apparatus. Physicists say sound is independent of any auditory apparatus for its existence. You will then answer the question in either way according to your point of view.

NEW BOOKS, ETC.

HOISTING MACHINERY. By Joseph Horner, A.M.I.M.E. New York: J. B. Lippincott Co., 1903. 8vo.; pp. 252; 215 engravings. Price \$3.

This book was written with the idea of showing the underlying principles, as well as the details, of crane construction, and illustrating the various types of hoisting apparatus in common use. As most of the manufacturers of such apparatus rely largely on experience for the correct proportioning of the parts, the author has omitted all formulas and theories pertaining thereto, and has made his book a handy technical reference work for all engineers and others desirous of knowledge on this subject.

DIZIONARIO TECNICO IN QUATTRO LINGUE. Tedesco. Italiano-Francese-Inglese. By Ing. Edoardo Webber. Milano: Ulrico Hoepli, 1904. 16mo.; pp. 611.

The only way in which to test the efficiency of a technical dictionary is to use it. That we have done. Although we have not always been able to find in this lexicon of Mr. Webber's the definition of every term that we have sought, still we have found his book, on the whole, an exceedingly helpful guide in translating. Most technical dictionaries are so far antiquated that the publication of the present volume is in many respects a welcome contribution from the Hoepli house.

OUTSTANDING ERRORS OF THE NAUTICAL ALMANAC. By Dodge P. Blackstone, A.M., C.E. Berlin, Wis.: George C. Hicks, 1903. 8vo.; pp. 55. Price, \$1.50.

A correct nautical almanac is of equally great value to the astronomer and to the mariner. To the former it is essential for the correct determination of stellar parallax, while to the latter it is quite necessary for making correct observations. Mr. Blackstone's pamphlet gives a mathematical demonstration, and corrects the errors found to one ten-thousandth of a second. It treats of the moment of inertia, the precession of the equinoxes, the mass of the moon, the ellipticity of the earth, and the outstanding corrections due to elliptical orbit.

SIMPLE EXPERIMENTS IN STATIC ELECTRICITY. By Percival G. Bull, M.A. Oxon. London: Percival Marshall & Co., 1904. 12mo.; pp. 71. Price, 20 cents.

This small volume is intended for the use of many young students who know more or less about practical electrical instruments and machines, but who have had little or no experience in the fascinating field of static electricity. The book describes fully most all the interesting experiments that can be made with simple apparatus, and it can be used alone or in connection with a more elaborate text book.

ARCHITECTS' AND ENGINEERS' HAND BOOK OF REINFORCED CONCRETE CONSTRUCTIONS. By L. J. Mensch. Chicago: Cement and Engineering News, 1904. 12mo.; pp. 217. Price, \$2.

Reinforced concrete, while considered to be the ideal building material of the future, is comparatively little used at present, owing to its not being well understood by even our most competent engineers and architects. This handbook was designed to convey to modern architects and engineers full information regarding the use of reinforced concrete constructions. It is copiously illustrated with photographs and drawings, and should prove of great value to the engineering fraternity.

X-RAYS SIMPLY EXPLAINED. A handbook on the theory and practice of radiography. By R. P. Howgrave-Graham. London: Percival Marshall & Co., 1904. 12mo.; pp. 93. Price, 20 cents.

This booklet for amateurs gives a clear and concise account, both historical and practical, of the experiments, discoveries, and improvements which have led up to the present knowledge of Roentgen rays and their application to pathology. Being intended for amateurs and students, it does not treat of the complicated and expensive apparatus, or of the latest developments in hospital methods. It gives, on the contrary, a thorough understanding of the elementary principles involved in X-ray work, and of the use and management of the essential pieces of apparatus employed, including the taking of radiographs and the construction of fluorescent screens. It is well illustrated.

HIE EUROPA!—HIE AMERIKA! Aus dem Lande der krassen Utilität. Von Jul. H. West, Ingenieur. Verlag von Franz Siemenroth in Berlin. Price, 50 cents.

Despite its sensational title Mr. West has in this book presented a rather shrewd analysis of American industrial conditions. His work,

"Star" Foot and Power Lathes
Automatic Cross Feed
FOR FINE, ACCURATE WORK
Send for Catalogue H.
SENECA FALLS MFG. CO.
695 Water Street,
Seneca Falls, N. Y., U. S. A.

ENGINE & FOOT LATHES
MACHINE SHOP OUTFITS
TOOLS & SUPPLIES
SEBASTIAN LATHE CO. CINCINNATI, O.

Foot and Power and Turret Lathes, Planers, Shapers, and Drill Presses.
SHEPARD LATHE CO., 133 W. 2d St., Cincinnati, O.

GIANT STEAM SHOVELS
Toledo Ohio, U.S.A.
The Vulcan Iron Works Co.

HIGHEST GRADE GREY IRON CASTINGS
For Gasoline Engines and Cylinders
All kinds of Automobile Castings.
FRONTIER IRON WORKS, 2 Auburn Ave., Buffalo, N. Y.

For Either Hand or Power
This machine is the regular hand machine supplied with a power base, pinion, countershaft, etc., and can be worked as an ordinary power machine or taken from its base for use as a hand machine. Length of pipe handle easily in small room. Illustrated catalogue—price list free on application.
MACHINE No. 78.
Range 2 1/4 in. R. H.
THE CURTIS & CURTIS CO.,
6 Garden St., Bridgeport, Conn.

Volt Ammeters
Pocket size, but large enough for accuracy and practical use. Various ranges for testing batteries, electric light, telephone and other circuits. Also Voltmeters and Ammeters for general measurements.
Send for Circular.
L. M. PIGNOLET,
50 Cortlandt St., New York, N. Y.

ARTESIAN
Wells, Oil and Gas Wells drilled by contract to any depth from 50 to 3000 feet. We also manufacture and furnish everything required to drill and complete same. Portable Horse Power and Mounted Steam Drilling Machines for 100 to 1200 feet. Write us stating exactly what is required and send for illustrated catalogue.
PIERCE WELL ENGINEERING AND SUPPLY CO.
136 LIBERTY STREET, NEW YORK, U. S. A.

STARRETT TOOLS
are the standard for Accuracy, Design, Workmanship and Finish.
Send for Free Catalogue No. 175, of up-to-date tools for mechanics.
The L. S. Starrett Co., Athol, Mass., U. S. A.

GAS ENGINE DETAILS.—A VALUABLE and fully illustrated article on this subject is contained in SUPPLEMENT No. 1292. Price 10 cents. For sale by Munn & Co. and all newsdealers.

TOOLS AS A TOPIC
must be interesting to every hand-craftsman. There is a mine of information in
Montgomery & Co.'s Tool Catalogue which enumerates thousands of tools. Capital handbook of reference. Profusely illustrated. Sent by mail for 25 cents. Discount sheet included.
MONTGOMERY & CO.,
105 Fulton St., New York City.

The Franklin Gas Engine
One-Half Horse Power
worth \$100 complete. We sell all necessary castings, materials and details for \$16.50. For real work—not a toy. 450 revolutions per minute. Upright or horizontal form. Finished parts sold separately. Runs by gas or gasoline. For boys and men with a mechanical turn. Write for circular.
PARSELL & WEED
129-131 West 31st Street, New York.

Every Hairbreadth of Surface Polished Perfectly by this Polishing Lathe.
GOODSELL-PRATT COMPANY, Greenfield, Mass.
Complete with Tail Stock, Feed Rest, Face Plate, Saw Arbor, and Three-Jawed Chuck Milled Bed. 5-in. Swing. Price, each \$7.50.

You Can Search
the world over without finding its equal as a universal pocket measure. Is an adding machine for estimators, gives the cutting speeds within the fraction of an inch, measures curved work, spirals and the like as quickly and positively as straight work and measures them quickly and accurately. Its simplicity is surprising. Circular.
STUCKENREITER MFG. CO.,
338 W. 58th Street, New York

Warren's Natural Asphalt Sand Surfaced ROOFING
APPLY IT YOURSELF
MAKES A FINISHED GRAVEL ROOF.
Comes ready to lay in rolls of 108 square feet. Write for sample, circular and prices.
Warren Chemical & Mfg. Co., 18 Battery Pl., New York

like many another book of the same kind, is intended to bring home to the mass of German manufacturers the magnitude of the "American peril," of which the German press has had occasion more than once to speak within recent years. Americans have little to learn from the book. Germans, on the other hand, will find in it a bold, clear statement of the causes for American commercial success.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending May 10, 1904.

AND EACH BEARING THAT DATE
[See note at end of list about copies of these patents.]

| | |
|--|---------|
| Adding machine, R. Sears..... | 759,478 |
| Addressing machine, J. S. Duncan..... | 759,249 |
| Adjusting spring, J. M. Ericson, et al..... | 759,507 |
| Air brake, H. Baluss, Jr..... | 759,226 |
| Air brakes, automatic train pipe coupling for, R. J. Weken..... | 759,784 |
| Air compressor, tide actuated hydraulic, W. O. Webber..... | 759,334 |
| Alarm system, F. McGloin..... | 759,464 |
| Alloy, S. Kneppel..... | 759,617 |
| Anchor, mooring, Shepard & Wimpenny..... | 759,759 |
| Anesthetic administering apparatus, A. G. V. Harcourt..... | 759,369 |
| Automatic brake, S. C. Burson..... | 759,666 |
| Axle setter, G. H. Stant..... | 759,766 |
| Axle, vehicle, S. C. Drake..... | 759,353 |
| Bag machine, Westervelt & Holmes..... | 759,785 |
| Bag machine, H. E. Westervelt..... | 759,786 |
| Bale compress, J. L. Sheppard..... | 759,399 |
| Bale tie, E. Vuncannon..... | 759,773 |
| Ball clamp, W. C. Ladd..... | 759,533 |
| Band fastener for cylindrical tanks, Ferguson & Eason..... | 759,255 |
| Band fastener, E. C. Tecklenburg..... | 759,328 |
| Basin, wash hand, F. W. Gordon..... | 759,696 |
| Battery, Noble & Anderson..... | 759,740 |
| Bed, combination folding, J. B. Wheatley..... | 759,788 |
| Bed, metallic folding, G. A. Mellen..... | 759,538 |
| Beds, etc., spring bottom for, W. C. Greese..... | 759,515 |
| Bedstead attachment clamp, G. P. Sharp..... | 759,560 |
| Bedstead spring holder, J. N. Graham..... | 759,698 |
| Bevel and square, combination, J. H. Schumacher..... | 759,319 |
| Bicycle seat post, H. Clemons..... | 759,672 |
| Binder, temporary, W. C. Vanden Berg..... | 759,410 |
| Boat launching apparatus, J. Brauchli..... | 759,340 |
| Bookin, A. V. J. Ireland..... | 759,283 |
| Boiler cleaner, locomotive, J. G. Talmage..... | 759,487 |
| Boiler tube cleaner, J. P. Prentice..... | 759,468 |
| Boiling bams, holder for, H. A. Kurlink..... | 759,451 |
| Book mark, H. C. Fairchild..... | 759,427 |
| Bookbinding, P. W. Ziegler..... | 759,795 |
| Bottle capping machine, R. A. Wittemann..... | 759,583 |
| Bottle closure, Baker & Gallagher..... | 759,496 |
| Bottle, non-refillable, F. D. Christensen..... | 759,347 |
| Bottle, non-refillable, J. B. Fitzgerald..... | 759,509 |
| Bottle, non-refillable, J. A. Edes..... | 759,597 |
| Bottle rinsing machine, W. J. Clifford..... | 759,349 |
| Bottle, water, R. W. Sampson..... | 759,555 |
| Bottle wrapper, A. Forbes..... | 759,402 |
| Box, H. B. Williams..... | 759,578 |
| Box fastener, F. L. Waldron..... | 759,419 |
| Brake beam, W. McMillan..... | 759,302 |
| Brake device, E. G. Shortt..... | 759,563 |
| Brake shoe, A. L. Streeter..... | 759,567 |
| Briquet binder, E. J. Hoffman..... | 759,443 |
| Bröller, P. Dedue..... | 759,504 |
| Broom washing machine, W. P. Bliss..... | 759,339 |
| Brushmaker's tool, H. Nielsen..... | 759,465 |
| Brush, tooth, J. A. Yates..... | 759,490 |
| Bucket, Aspin & Erickson..... | 759,224 |
| Burglar alarm, A. J. Kercher..... | 759,615 |
| Burglar alarm, G. A. Sachs..... | 759,437 |
| Burner attachment and shade support, extensible, C. T. Fuller..... | 759,689 |
| Burner casing, C. H. Montgomerie..... | 759,541 |
| Butter cutter, J. B. Bloom..... | 759,458 |
| Button shank former, thread, M. V. Quinn..... | 759,307 |
| Cabinet, J. L. Tandy..... | 759,770 |
| Cabinet, dispensing, J. Lines..... | 759,724 |
| Cable hanger, F. E. Wey..... | 759,787 |
| Caisson, D. E. Moran..... | 759,388 |
| Calendar, P. M. Rand..... | 759,549 |
| Can and opener therefor, E. G. Moersch..... | 759,460 |
| Can capping machine, C. B. McDonald..... | 759,300 |
| Canned fruits, vegetables, etc., process kettle for, J. Baker..... | 759,411 |
| Car, Lindstrom & Streib..... | 759,290 |
| Car coupling, A. E. Waggener..... | 759,331 |
| Car coupling machine, G. W. Bowling..... | 759,234 |
| Car feeder, F. R. Keith..... | 759,446 |
| Car, freight, H. S. Hart..... | 759,275 |
| Car, freight, O. M. Jones..... | 759,285 |
| Car panel, convertible, J. A. Brill..... | 759,661 |
| Car replacer, L. B. Gump..... | 759,702 |
| Car scraper, B. B. Jenkins..... | 759,377 |
| Car side bearing, J. E. Newcomer..... | 759,304 |
| Car wheel, H. H. Hayward..... | 759,812 |
| Cars, cheek piece or plate for holding the draft rigging to the under sides of, T. H. Simpson..... | 759,321 |
| Carburetor, F. C. Merrege..... | 759,539 |
| Carburetor, hydrocarbon engine, M. A. Rutenber..... | 759,396 |
| Carding machine, J. J. Henderson..... | 759,439 |
| Carding machine attachment, J. T. Griffith..... | 759,271 |
| Carpet renovator, pneumatic, A. Letz..... | 759,452 |
| Cart, hand, J. A. Baines..... | 759,495 |
| Casing swage, F. W. Jones..... | 759,379 |
| Caseln, treatment of, L. A. Dreyfus..... | 759,808 |
| Cash register, A. Pfaff..... | 759,467 |
| Cash register, S. Rhoades..... | 759,749 |
| Casket fastener, sheet metal, J. Maxwell..... | 759,727 |
| Casket, sheet metal, J. Maxwell..... | 759,728 |
| Caster, W. A. Tonini..... | 759,408 |
| Caster wheel, C. E. Myers..... | 759,299 |
| Casting apparatus, G. Stroh..... | 759,569 |
| Cement clinker, etc., apparatus for burning, Portland, T. A. Edison..... | 759,357 |
| Cement clinker, etc., burning Portland, T. A. Edison..... | 759,356 |
| Chaff, H. E. Cook..... | 759,476 |
| Chimney cowl, B. S. Whitt..... | 759,789 |
| Chromium, making metallic, A. K. Eaton..... | 759,424 |
| Cigarette roller, C. Schopke..... | 759,476 |
| Circuit changer, C. C. Cadden..... | 759,237 |
| Clock, R. Korhage..... | 759,619 |
| Cloth winding machine, N. Jarvis..... | 759,376 |
| Clothes line, S. A. Owens..... | 759,394 |
| Clutch, friction, W. C. Davis..... | 759,841 |
| Coat collar, H. Hoffman..... | 759,371 |
| Coating metal objects, A. Johnson..... | 759,528 |
| Cock or valve, safety, D. T. Brown..... | 759,341 |
| Coffee mill, S. T. Wallace..... | 759,781 |
| Coherer, A. H. Stewart..... | 759,835 |
| Cellar supporter, lady's, K. D. Stevenson..... | 759,403 |
| Combs from celluloid, manufacture of, C. Bensinger..... | 759,413 |
| Compressing material into form, attachment for machines for, H. J. Flood..... | 759,259 |
| Concrete construction, mold for metal, C. Weber..... | 759,573 |
| Converters, etc., apparatus for the introduction of pulverulent substances into, G. Rosenthal..... | 759,750 |
| Conveying apparatus, T. S. Miller..... | 759,295 |
| Copper ores, reduction of, E. P. Clark..... | 759,670 |
| Corn husking and shredding machine, W. B. Martindale..... | 759,725 |
| Corn picker and husker, M. D. Hatch..... | 759,370 |
| Corn shelling mechanism, J. E. Simmons..... | 759,401 |
| Corn sorter, seed, L. P. Graham..... | 759,811 |
| Corset, K. Golais..... | 759,266 |
| Corset attachment, K. H. McFarland..... | 759,542 |
| Cotton gin, A. McGonagle..... | 759,390 |
| Cotton gin, R. Starrett..... | 759,484 |
| Cotton press, C. J. Luce..... | 759,386 |
| Coupling, T. J. Grier..... | 759,270 |
| Crate, H. N. Backus..... | 759,653 |

Packard
Four-Cylinder
Model "11" 1904

Actual 22 horsepower, with only 85 lbs. loaded weight to each horse power. Speed range of 4 to 44 miles per hour. Anti-friction ball bearing axles, direct drive, mechanical valves for intake and exhaust. Winner of highest prizes for BOTH speed and endurance wherever entered.
\$3 000

Send for illustrated descriptive literature and name of nearest agent.
PACKARD MOTOR CAR CO., Dept. 6, Detroit, Mich.
Member Association of Licensed Automobile Manufacturers.
New York Agents:—PACKARD Motor Car Co., of N. Y., 317-319 W. 55th St., New York City.

The Apple AUTOMATIC
For Gas Engines, Locomotives, Automobiles, etc.
No more belt, battery and commutator troubles. Dirt and waterproof. Easily attached increases power and speed. Send for full particulars on our ignition apparatus.
The Dayton Electrical Mfg. Co. SPARKER
95 Reibold Bldg., Dayton, Ohio.

1/4 H. P. Gas Engine Castings
FOR \$15 WITH BLUE PRINTS.

Cylinder bored and faced-off.
Runs by gas or gasoline. Water-jacketed.
1/4 H. P. Castings—not bored or faced—\$16.00. Send for catalogue of engines, dynamos, electrical supplies.
L. W. GILLESPIE & CO., 232 E. 4th St., Marion, Ind.

DIVIDEND
PAYING MINING, OIL, TIMBER, SMELTER, AND INDUSTRIAL STOCKS making possible LARGE INTEREST AND PROFITS, listed and unlisted, our specialty. Booklets giving full information mailed free on application.
DOUGLAS, LACEY & CO.,
Bankers & Brokers, 66 Broadway, New York

Valuable Books Home Mechanics for Amateurs

This book has achieved an unparalleled success in one week, and a Special Edition of 4,000 copies has been ordered. It is by far the largest and best book on the subject ever offered at such a low price. It tells how to make things the right way—the "only" way—at small expense. It will prove of value to you—much more than you realize. Do things with your hands. Send for a circular giving contents—the circulars cost only a cent—the book \$1.50 postpaid. If the book could meet you face to face you would be the first to purchase. The first large edition is almost gone, order to-day.

370 Pages 326 Engravings Price \$1.50

REVISED and ENLARGED EDITION
The Scientific American
Of Receipts, Notes and Queries.
Cyclopedia
15,000 Receipts. 734 Pages.
Price, \$5.00 in Cloth. \$6.00 in Sheep. \$6.50 in Half Morocco. Post Free.

This work has been revised and enlarged,
900 New Formulas.
The work is so arranged as to be of use not only to the specialist, but to the general reader. It should have a place in every home and workshop. A circular containing full Table of Contents will be sent on application. Those who already have the Cyclopedia may obtain the
1901 APPENDIX.
Price, bound in cloth, \$1.00 postpaid.

A Complete Electrical Library.
By PROF. T. O'CONNOR SLOANE.

An inexpensive library of the best books on Electricity. Put up in a neat folding box as shown in cut. For the student, the amateur, the workshop, the electrical engineer, schools and colleges. Comprising five books, as follows:

Arithmetic of Electricity 138 pages, \$1.00
Electric Toy Making 140 pages, \$1.00
How to Become a Successful Electrician 189 pages, \$1.40
Standard Electrical Dictionary, 682 pages, \$3.00
Electricity Simplified 155 pages, \$1.00
A valuable and indispensable addition to every library.

Our Great Special Offer.—We will send prepaid the above five volumes, handsomely bound in blue cloth with silver lettering, and inclosed in a neat folding box, as shown in the illustration, at the Special Reduced Price of \$5.00 for the complete set. The regular price of the five volumes is \$7.00.

Full descriptive circulars of above books will be mailed free upon application.

MUNN & CO.,
Publishers, 361 Broadway, New York.