

Tows to Build with little 2 vols. large Quarto, 378 litustrations. Price 31. Contains designs for Villas, Farm Houses, Cottages, Barns and Outhouses of every description, also for Hotbeds, Cisterns, &c., &c. "Precisely meets a want which thousands have felt." N. 7. Observer. As it is impossible to describe these books in an adv't or even in a circular, we send them, post-paid, for examination, on receipt of \$1, to be returned and money refunded, if not entirely satisfactory. Address, Cooperative Building Plan Association, 24 Beekman St. (Box 2702), New York. (Mention this paper.)

CORNELL UNIVERSITY.

MECHANICAL ENGINEERING ELECTRICAL ENGINEERING, CIVIL ENGINEERING, AND ARCHITECTURE.

ENTRANCE EXAMINATIONS BEGIN AT 9 A.M. JUNE 18 and SEPT. 18, 1883.

For the University Register, containing full statements regarding requirements for admission, courses of study, degrees, honors, expenses, free scholarships, etc., and for special information, apply to THE PRESIDENT OF CORNELL UNIVERSITY, Ithaca, N.Y.

ROP FORGINGS OF IRON BEECHER & PECK, NEW HAVEN CONN.

25 Imported design Chromo Cards for 1883, name on 10c. Quality not quantity. Warranted best sold. Bonanza for agents. FRED L. JONES, Nassau, N.Y.



LYON & HEALY, State and Monroe Streets, CHICAGO, Will send prepaid to any address their Illustrated Price List of **Latent Style Banjos**.

ust the instrument for Price, Camping Parties, Summer Evening enades, etc. Now the rage in best society. Price, \$3 and upwards.

PHE attention of MANUFACTURERS about the anging MANUFACTURERS their location, and of those who are seeking a place in which to establish themselves, is invited to the yof PO UGHKEEPSIE, on the Hudson River, midway tween New York and Albany.

POUGHKEEPSIE OFFERS
entiful supply of good and wholesome water at low rates.
A complete system of sewers.

overlent access to the great market of America. eap freights by rail and water. eap living, which insures labor at reasonable

wages.
An attractive and healthy place of residence.
Address "Association for the Promotion of Useful Manufactures."

JOHN I. PLATT, President.

FIRE BRICK THE AND CLAY RETORTS ALL SHAPES BORGNER & O'BRIEN 23 5 7 ABOVE RACE, PHILADELPHIA

TO MANUFACTURERS—To Lease Water Front. mile and a half in extent. docked and ready for immediate use; within twenty miles of New York City, on Long Island Sound, having railfood as well as water communication. Manufacturers and others needing much or little room can have suitable accommodation, with long lease, at nominal rent. The introduction of manufacturing interests upon the property the primary object of the owners. Further particulars on applying to or addressing the agents,

RULAND & WHITING,

5 Beekman St., New York.

SOUTHWESTERN VIRGINIA AND ITS SOUTHWESTERN VIRGINIA AND ITS Undeveloped Resources.—By Junes Hogg. An interesting account of the mineral resources of Southwestern Virginia and of the bordering counties of North Carolina. Precious meta s. Minerals. Coal. Mineral springs. Agricultural features. Scenery. Characteristics of the inabilitants. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, NO. 366. Price III cents. To be had at this office and from all newsdealers



OPIUM

Habit easily cured with CHLORIDE OF GOLD LEADER. KEELEY, M.D., SURGEON, G. & A.R. R. DWICHET, Illinois.

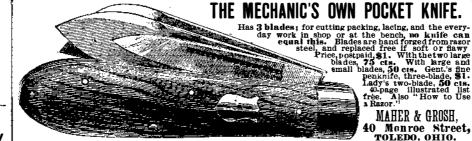
MANHOOD! THE SCIENCE !

IOW THYSELF.4 A Book for Every Man!

Young, Middle-Aged, and Old.

The untold miseries that result from indiscretion in early life may be alleviated and cired. Those who doubt this assertion should purchase and read the new medical work published by the Peabody Medical Institute. Boston, entitled the Science of Life; at Self-Preservation. It is not only a complete and perfect treatise on Manhood. Exhausted Vitality, Nervous and Physical Doblity, Premature Decline in Man, Errors of Youth, etc., but it contains one hundred and twetty-five prescriptions for acute and chronic diseases, ench one who will be a surface of the contains of the contains one hundred and twetty-five prescriptions for acute and chronic diseases, ench one of which is invaluable, so proved by the author, whose experience for 21 years is such as probably neverbefore fell to the lot of any physicism. It contains 300 pages, bound in beautrful embossed covers, full gitterney, or professional—than any other work retailed in this country for £2.50, or the money will be refunded. Price only £1.25 by mail. Gold medial awarded the author by the National Medical Association. Hustrated sample sont on receipt of six cents. Send now.

Address PEABODY MEDICAL INSTITUTE, or DR. W. H. PARKER, No. 4 Building Street, Boston, Mass. The author may be consulted on all disease requiring skill and experience. Young, Middle-Aged, and Old.



TRANSMITTING GEAR: IMPROVED. Description of a new system of transmission, of variable velocity, devised by Mr. Jose da Silva Sertoré, for sewing machines and other purposes, so that any motor whatever may be used and the action of the pedal be dispensed with. Illustrated with two figures. Contained in Scientific American Scipplement, No. 359. Price Ilcents. To be had at this office and from all newsdealers.

THE RIDER HOT AIR COMPRESSION Pumping Engine,

For city and country residences where it is required to raise a supply of water. Simple, Economical, Effective.

Noskill required to run it. We can refer to ourcustomers of eight years standing. Send for catalogue. CAMMEYER & SAYER, 19 Dey St., New York,

WATCHMAKERS.

Before buying, see the Whitcomb Lathe and the Webster Foot Wheel, made by the AMERICAN WATCH TOOL CO., Waltham, Mass.

WANTED.—FIRST-CLASS PATTERN MAK-ERS. To a good man steady work and first-class pay. Address B. W. PAYNE & SONS, Corning, N. Y.



ROOFING.

nird the cost of tin. Circuars and samples free Wanted. T. NEW. 32 John Street. New York



Claric's Noiseless Rubber Wheels Absolutely prevent splintering and wearin of floors caused by use of Iron Wheels Adapted for Trucks Boxes, Baskets, Tubbe and work of every kind in Mills, Ware houses, Stores, etc. Chalogue free. GEO. P. CLARK, Windsor Locks, Ct.

MAHER & GROSH,

PERFECT

NEWSPAPER FILE

The Koch Patent File, for preserving newspapers, magazines, and pumphlets, has been becently improved and price reduced. Subscribers to the SCIENTIFIC AMERICAN SUPPLEMENT can be supplied for the low price of \$1.50 by mail, or \$1.25 at the office of this paper. Heavy board sides; inscription "SCIENTIFIC AMERICAN," in gilt. Necessary for every one who wishes to preserve the paper.

Address

MUNN & CO.,

Publishers SCIENTIFIC AMERICAN

<u>send to</u>LONDON,BERRY&ORTON THE BEST BAND SAW BLADE

We have r ceived following letter in regard to one of our No. 5 "L" (\$16)

Steam Jet Pumps elevating 14 inch jpe of water more than 50 feet high:

"VAN DUZEN & TIPT. Cincinnati, O:
"Money could not buy the Jet of us unless another could be had. I would not give your No. 5" L" for a \$700 pump, equal distance to raise.

We make Ten Sizes of these Pumps. Prices \$7 to \$75. Capacities 100 to \$300 gallons per hour. State for what purpose wanted and send for Catalogue of "Pumps."

VAN DUZEN & TIPT, Cincinnati, O.

We make Ten Sizes of these Pumps. Prices \$7 to \$75. Capacities 100 to \$300 gallons per hour. State for what purpose wanted and send for Catalogue of "Pumps."

VAN DUZEN & TIPT, Cincinnati, O.



BLAKE'S CHALLENGE" ROCK BREAKER.

Patented November 18, 1879.

For Macadam Road making, Ballasting of Railbroads. Crushing Ores, use of Iron Furnaces, etc. Rapidly superseding our older size of Black Crusher on account of its superior strength, efficiency, and simplicity. Adopted by important Railway and Mining Corporations Cities, and Towns. First Class Medals of Superiority awarded by American Institute 1879 and 1880.

RIAKE CRISHED CO.

BLAKE CRUSHER CO., Sole Makers, New Haven, Conn.



SIBLEY & WARE, South Bend, Indiana.

SPECIALTIES: 19½ INCH DRILL PRESSES,

WHEEL OR LEVER FEED, AND GEAR CUTTING. PRICES REASONABLE.

M

STEMWINDING Permutation Lock, No. 125. For any may use either 1, 2, 3, or 4 of its 50 numbers. Millons of changes equally possible and easy. Security unrivaled. Simple, durable, nickel plated. Send \$2.50 for sample by mail, or stampfor Illustrated List of Locks, Tills, and Padlocks. D. K. Miller Lock Co., Phila., Pa.

For Sale.—Valuable patent for Galvanic Battery. Surpasses all others. Cheaply Constructed. For par-ticulars, address E. F. SCHLOSSER, Hoboken, N. J.

ATOMS, MOLECULES, AND ETHER Waves.—By John Tyndall, F.R.S. An interesting paper. The sensation of light. Effect of heat upon molecules. Decomposing power of light waves. Influence of musical sounds upon jets of liquid. Stability of molecules. Radiant heat as a means of expioring molecular conditions. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 365. Price 10 cents. To be had at this office and from all newsdealers.



Valuable U. S. Patent for Mixing and Crushing Machine in great demand among Chemists, Grocer Drysalters, etc., to be disposed. Address P. H. BRACHER & CO., Wincanton, England



ERICSSON'S New Caloric Pumping Engine,

Dwellings & Country Seats Simplest! Cheapest! Eco-nomical! Absolutely Safe! Delamater Iron Works, C. H. Delamater & Co., Proprietors,

16 Cortlandt Street, New York, U. S. A.

\$5 to \$20 per day at home. Samples worth \$5 free. Address Stinson & Ca., Portland, Me.

FEED-WATER HEATER AND PURI-FEED-WAIER HEALER AND FURI-feer.—Detailed description, by Geo. S. Strong, of a new feed-water heater and purifier, which effectually free the water from all matters, soluble and insoluble, and passes it to the boiler devoid of any substance that would cause scaling or coherent deposit. Illustrated with two figures Contained in SCIENTIFIC AMERICAN SUPPLEMENT. NO. 363. Price 10 cents. To be had at this office and from all newsdealers.

UNIVERSAL

Pulverizes everything—hard, soft, gummy, etc.
The best Clay Grinder and the best Cotton Seed
Huller in the world.
Portable Steam Engines, Stationary Engines,
Horizontal and Upright Boslers, all sizes on
hand for immediate delivery.

10 Barclay St., N. Y. City.

this office and from all newsdealers

PATENT QUICK NEW HAVEN MANUFACTURING CO. NEW HAVEN, CONN., MANUFACTURERS OF IRON WORKING

MACHINE TOOLS

Lathes, Planers, Drills, Shapers, etc.
ILLUSTRATED CATALOGUE ON APPLICATION.





RUBBER BACK SQUARE PACKING.

BEST IN THE WORLD. For Packing the Piston Rods and Valve Stems of Steam Engines and Pumps.

B represents that part of the packing which, when in use, is in contact with the Piston Rod.

A, the elastic back, which keeps the part B against the rod with sufficient pressure to be steam-tight, and yet eates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

NEW YORK BELTING & PACKING CO., JOHN H. CHEEVER, Treas. Nos. 13 & 15 Park Row, opp. Astor House, New York.

ROOT'S NEW IRON BLOWER

POSITIVE BLAST IRON REVOLVERS, PERFECTLY BALANCED, Has Fewer Parts than any other Blower.

P. H. & F. M. ROOTS, Manufacturers, CONNERSVILLE, IND.
S. S. TOWNSEND, Gen. Agt., 2º Cortland St., 9Dey St.,
COOKE & CO., Selling Agts., 92 Cortland Street,
JAS. BEGGS & CO., Selling Agts. 9 Dey Street,
NEW YORK.
SEND FOR PRICED CATALOGUE.



WANTED IMMEDIATELY, at Huntington, West Va., AN EXPERIENCED BRASS MOULDER, Address, with reference and and terms, THE ENSIGN M'F'G CO:

FOSSIL MEAL COMPOSITION,

The Leading Non-Conducting Covering FOR

BOILERS, PIPES, ETC.

With % to % inch thickness it radiates less heat than any other covering dees th 2 inches. Weighs very light, is very durable, fireproof, and is easily applied. Sold in a dry state by the pound. FOSSIL MEAL CO., 48 Cedar St., New York.

WANTED-FOR EMAN FOR MALLE-ABLE I CON FOUNDRY. Address X, Box 773, New York.

NEW TELEPHONE For Private Lines. Pat'd. Unquestionably the Best, Works 2 miles. Pat'd Wire; Late Improvements. Circulars free. Amplifying Tel. Co., Cleveland. O.

HORSES. - THE FOLLOWING VALU-

Works 2 miles. Pat'd Wire; Late Improvements. Circulars free. Amplifying Tel. Co., Cleveland. O.

HORSES. — THE FOLLOWING VALUable papers are contained in the SCIENTIFIC AMERICAN SUPPLENENT. I'rice 10 cents each, sent by mail to any address. To be had at this office or of newsdealers in all parts of the country. Please order by the numbers in large type, which indicate the number of the SUPPLENENT in which indicate the number of the SUPPLENENT in which thearticle is contained.

Evolution of the American Trotting. Horse. By Prof. W.H. Brewer. A valuable paper, showing the gradual development of the trotting quality from year to year in the spatial stable of the best trotting time on record at all distances and all ways of going, from 1830 to and including 1882, embracing Trotting in Harness. Trotting to Wagon, Trotting to Double Teams, Trotting more Saddle, and Pacing. 374.—Horses' Legs. Seven illustrations, showing the forms of sound and unsound legs, malformations, etc. 192.—Breaking Horses by Electricity. Engraving. 208.—Polydactyl Horses, Recent and Extinct. Illustrations. By Prof. O.C. Marsh. 188.—History of the Horse Bot.-fy. By Dr. N. Joly. With thirty-four figures. 212.—On the Care of Horses. 123. 185.—Specification of the Points of a Good Horse. 103.—Portable Food for Horses—How to Make, 98.—Best Mode of Feeding Farm Horses. 2.—The Perfect Horse and how to Measure Him. With engraving. 29.—Peculiarities in Structure of the Horse. Calculus in Horse. Mash for \$8.

Fortraits of Celetrated Horses. Sefton. Winner of the Derby. 134.—Vermul, winner of he Ascot Cup. 136.—Sir Bevys and Wheel of Fortune, Winners of the Derby. 135.—Iroquois, Winner of horses and other animals. 273.—Bair Athol, the Most Valuable Horse ever known. 355.—English Cart Horses. 10.—The Horse's Motions. as suggested by Muybridge's photographs. 12 illustrations. 226.—How to The Horse in Mustrations. 226.—How to The Horse in Winner of horses and other animals. 273.—The Horse's Motions. as suggested by Muybridge's ever known. 355.—English Car



MESSRS, MUNN & CO., in connection with the pub-COST AND EXTENT OF POWER TO make Flour.—Contained in Scientific American, continue to exmine Effour.—Contained in Scientific American at the Scientific American and to act as Solicitors of Patents for Inventors.

> In this line of business they have had thirty-eight years experience, and now ave mequaled facilities for the preparation of Patent Drawings, Specifications, and the prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on verv reasonable terms.

> A pamphlet sent free of charge, on application, containing full information about Patents and how to procure them; directions concerning Labels, Copyrights, Designs. Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases, Hints on the Sale of Patents, etc.

> We also send. free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world.

MUNN & CO., Solicitors of Patents, 261 Broadway, New York. BRANCH OFFICE - Corner of F and 7th Streets, Washington, D. C.