

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.
"Abbe" Bolt Forging Machines and "Palmer" Power
Hammers a specialty. Forsaith & Co., Manchester, N.H.

Buckle, W. F. Mitchell..... 289,624
Buoy, oil discharging, J. Shields..... 289,720
Burglar alarm, O. Conrad..... 289,624

Foil and paper fabric, combined, H. S. & L.
Crooke..... 289,505
Folding table or flowerpot stand, B. Stetson..... 289,464

Planter, potato and seed, W. H. Little..... 289,672
Plow fender, J. J. McCarter..... 289,432
Plow frame, gang, E. S. Benham..... 289,376

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted December 4, 1883.

AND EACH BEARING THAT DATE.

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

A dding machine, J. N. Wilson..... 289,488
Air engine heater, J. A. Woodbury et al..... 289,484

Condensers, injection regulator for steam, T.
Bliss..... 289,609
Conveyor, S. Stutz..... 289,406

Embroidery machine, S. S. B. & Co..... 289,444
Lamp, A. L. Dawson..... 289,510
Lamp burner, Schwintzer & Graff..... 289,571

Shirt waist, Galup & Churchill..... 289,639
Slate, school, C. F. Rapp..... 289,711
Soda water apparatus, J. Matthews..... 289,777

Umbrella and parasol handle, J. T. Smith.....	289,722
Uniting sheets of fibrous and other materials, W. S. Seymour.....	289,455
Valve, balanced slide, J. P. McCook.....	289,678
Varnish, C. M. Ely.....	289,766
Vault cover and ventilator, combined, T. W. Langgill.....	289,663
Vehicle brake, automatic, R. R. Pace.....	289,698
Vehicle spring, R. Mulholland.....	289,438
Vehicle wheel, T. Warwick.....	289,738
Vehicle, wheeled, T. F. Krajewski.....	289,421
Vent for casks, J. Poznanski.....	289,555
Ventilator. See Window sash ventilator.	
Ventilator, M. A. W. Louis.....	289,426
Wafton, dumping, K. Kennedy.....	289,660
Washer. See Tumbler washer.	
Washing machine, E. W. Bush.....	289,615
Washing machine, W. Holben.....	289,416
Washing machine, E. K. Lecrone.....	289,775
Watch, G. Thommen.....	289,728
Watch winding indicator, R. Heusch.....	289,533
Watches, anti-magnetic shield for, C. K. Giles.....	289,642
Water closet and trap, J. Bendor.....	289,495
Water motor, S. S. Richardson.....	289,560
Wheel. See Fifth wheel.	
Window sash ventilator, E. W. Chadwick.....	289,387
Window screen, J. N. Gibney.....	289,526
Window shade and screen, E. Green.....	289,408
Wire barbing machines, center for, W. T. Burrows.....	289,750
Wire fabrics, machine for making, W. J. Davison.....	289,507
Woven fabric and loom for weaving the same, A. Urbahn.....	289,731
Wrench. See Machine wrench.	
Wrench, J. Davidson.....	289,506

DESIGNS.

Bag or satchel, hand, A. L. Silberman.....	14,464
Calendar card, H. Toasperm, Jr.....	14,465
Fire place back, Jackson & Hankinson.....	14,462
Lamp and chandelier body, J. & J. A. Kasschau.....	14,473

TRADE MARKS.

Bricks, Hedges & Smith.....	10,769
Butter, manufactured or artificial, C. A. Watson.....	10,757
Canned goods, G. W. Baker.....	10,752
Cigars, L. Marx.....	10,761
Hair waves, M. E. Thompson.....	10,768
Hardware, saddlery, North & Judd Manufacturing Company.....	10,762
Knives, forks, and spoons, L. F. Dunn.....	10,765
Liniment, oil, J. H. Hess & Co.....	10,766
Medicines, chill, fever, and ague, W. J. W. Kerr & Son.....	10,754
Remedy for epilepsy, H. F. Schweer.....	10,755
Remedy for private diseases, F. Stearns & Co.....	10,756
Sheet metal, Republic Iron Works.....	10,767
Soap, toilet and laundry, Olds & Co.....	10,763
Stoves, ranges, furnaces, and heaters, cooking, C. Rathbone.....	10,764
Tobacco and cigars, manufactured, T. C. Williams & Co.....	10,758
Tubing, metal, E. C. Converse.....	10,759
Wheat, whole winter, D. Hubbard.....	10,753

A related copy of the specification and drawing of any patent in the foregoing 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, New York. 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.

Canadian Patents may now be obtained by the inventors for any of the inventions named in the foregoing list, at a cost of \$40 each. For full instructions address Munn & Co., 261 Broadway, New York. Other foreign patents may also be obtained.

Advertisements.

Inside Page, each insertion - - - 75 cents a line.  
Back Page, each insertion - - - \$1.00 a line.  
(About eight words to a line.)  
Engravings may head advertisements at the same rate per line, by measurement, as the letter press. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

**Van Duzen's Pat. Loose Pulley Oiler**  
HAS Highest Indorsements, Envyable Reputation, Scientific Pedigree.  
A two years' test by conservative manufacturers of national reputation has shown it to be the only perfect Lubricator for Loose Pulleys in use. Prices very reasonable. Send for our "Catalogue Number 55."  
VAN DUZEN & TIER, Cincinnati, O.

\$10 to \$1,000 buys county rights to manufacture and sell valuable invention required in every house, etc. Indorsed by highest authority. No competition. Profits 200 per cent. Specially suited woodware trades. Address J. BADGER, Rockville Centre, Long Island, N. Y.

**CASP. DIETR. WALZHOZ,**  
HOHENLIMBURG, GERMANY,  
MANUFACTURER OF  
Hardened Steel Strips for Corset Clasps,  
Hoopskirts, Feathers, and Brushes.

**SHEPARD'S CELEBRATED**  
Screw Cutting Foot Lathe.  
Foot and Power Lathes, Drill Presses, Scrolls, Saw Attachments, Chucks, Mandrels, Twist Drills, Dogs, Clippers, etc. Send for catalogue of outfits for amateurs or artisans. Address  
**H. L. SHEPARD & CO.,**  
341 & 343 West Front St., Cincinnati, O.

**THE ELECTRICAL WORLD,**  
The Pioneer weekly Electrical Journal of America. Edited by experts. Noted for explaining electrical principles, new inventions, etc., in simple and easy language, free from technicalities. Able original articles, handsomely and copiously illustrated. All the news and progress in Telegraphy, Telephony, and Electric Lighting. First and fullest descriptions, with cuts, of new electrical inventions. Cheapest and largest circulating journal of its class in the world. Indispensable to all interested in electrical matters. Same size as SCIENTIFIC AMERICAN. 16 pages; weekly; subscription one year, \$2.00. Foreign Countries in the Universal Postal Union, \$3.00. Your subscription is solicited. Sample copies mailed free. **W. J. Johnston, Pub., 9 Murray St., New York.**

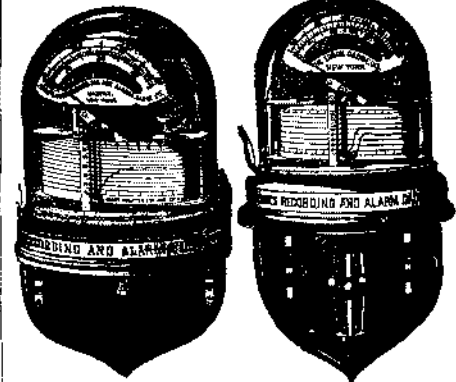
**FRIEDR. BOECKER PHILIPPS SOHN & CO.,**  
HOHENLIMBURG, GERMANY,  
MANUFACTURERS OF  
Hardened Steel Strips for Corset Clasps,  
Hoopskirts, Feathers, and Brushes.

**Syracuse Malleable Iron Works**

**PERSPECTIVE AND ITS APPLICATION**  
To Artistic Drawing.—A paper by J. Romilly Allen, Assoc. M. Inst. C. E. giving, by the aid of a series of models, an explanation of the fundamental laws of perspective, and showing how far they are applicable to artistic drawing. Illustrated with eight figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 403. Price 10 cents. To be had at this office and from all newsdealers.

**To Electricians, Water Boards, Manufacturers, and others using Steam, Water, Air, or Oil under Pressure.**

Time and Pressure Recording Gauge and Alarm for Offices. Time, Speed, and Pressure Recording Gauge and Alarm for Factories, etc.



Edson's inventions shown in these cuts are specialties. They were adopted and used at the Centennial Exposition as Standards for Expert Testing for steam boilers, steam gauges, etc., and they are guaranteed for Accuracy and Durability. They are alike adapted for Air, Oil, Steam, or Water Pressure. One year's supply of daily charts, printed and ruled to special scale of each instrument, also Sheet and Brackets, sent free of extra charge with the gauges. Full instructions for unpacking, setting up, and running always sent with instrument. For pamphlets and prices address

**M. B. EDSON,**  
77 Liberty St., New York.

Burgess' Blow Pipe Pump, invaluable to every intelligent metal worker, for Tempering, Brazing, Hard and Soft Soldering. Gives Gentlest Flame or Hottest Blast. \$10. Circumference free. **J. ELLIOTT SHAW, 154 S. Fourth St., Phila.**

WATCHMAKERS.

Before buying, see the Whitcomb Lathe and the Watch Co., which is the AMERICAN WATCH CO., New York.

**BOOKWALTER ENGINE.**  
Compact, Substantial, Economical, and easily managed; guaranteed to work well and give full power claimed. Engine and Boiler complete, including Governor, Pump, etc., at the low price of  
3 HORSE POWER..... \$240 00  
4 1/2 "..... 280 00  
6 "..... 320 00  
8 "..... 360 00  
10 "..... 400 00  
Put on cars at Springfield, O. **JAMES LEFFEL & CO.,** Springfield, Ohio, or 110 Liberty St., New York.

**SPECIFICATION FOR A RAILWAY LINE.**—An important engineering paper, being a full copy of a recent contract made by a construction company for building a certain portion of a new railway. Several new departures are shown in the writing of the specifications. The bids are to be very detailed, and almost every possible condition and kind of work is fully specified; and, under each head, the class of work so covered by the contract price is as clearly expressed as possible, leaving little room for doubt or dispute. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 402. Price 10 cents. To be had at this office and from all newsdealers.

**PECK'S PAT. DROP PRESS.**  
NEW HAVEN, CONN.  
BEECHER & PECK.

**CART SADDLE PADS.** Outfit with full instructions how to make them for \$35. Address F. A. EVELY, LETH, Cynthiana, Harrison Co., Ky. Lock Box 29.

**A \$60 SHEPARD FOOT LATHE** for sale. Almost new. Price \$50. Address **A. B. WORTH, Greenport, L. I., N. Y.**

**AMATEUR MECHANICS.**—Model Engine Castings, Stationary, Locomotive, and Marine. From \$1.75 per set. **J. GILBERT, 211 Tenth Ave., New York.**

**Rider's New and Improved COMPRESSION Hot Air Pumping Engine**  
New and Improved Designs.  
**INTERCHANGEABLE PLAN**  
MANUFACTURED BY  
**DELAMATER IRON WORKS,**  
C. H. DELAMATER & Co., Proprietors,  
No. 16 CORTLANDT ST., NEW YORK, N. Y.

**FOR SALE.**—A quarter interest in the American Hoop Driving Machine (illustrated on page 111, vol. 49). It will do the work of ten men and do it better. Now in operation in this city. **J. WOOD, JR.,** 242 South 3d Street, Philadelphia, Pa.

**SEND TO LONDON BERRY & ORTON**  
PHILADELPHIA  
**THE BEST BAND SAW BLADE**

**UNIVERSAL**  
The Newell  
Pulverizes everything—barrel, soft, gunny, etc. The best Clay Grinder and the best Cotton Seed Huller in the world.  
Portable Steam Engines, Stationary Engines, Horizontal and Upright Boilers, all sizes, on hand for immediate delivery.  
**10 Barclay St., N. Y. City.**

**GET THE BEST AND CHEAPEST.**  
TRADE MARK  
**Silver Finish.**  
**J. A. FAY & CO.,**  
(Cincinnati, Ohio, U. S. A.)  
Exclusive Agents and Importers for the United States, of the  
**CELEBRATED**  
**PERIN BAND SAW BLADES,**  
Warranted superior to all others in quality, finish, uniformity of temper, and general durability. The Perin Saw outwears three ordinary saws.

WORKSHOP RECEIPTS.

**SECOND SERIES.**  
A reliable Handbook for Manufacturers, Mechanics, and Scientific Amateurs. 485 pages, size 7 1/2 x 5 inches. Price Two Dollars, postage prepaid.  
Descriptive Catalogue and Circulars mailed free.

**E. & F. N. SPON, 35 MURRAY ST., NEW YORK.**

**PROPER HORSE-SHOEOING.**—A PAPER of great interest to every horse owner, giving many valuable hints on the subject of horse-shoeing, and showing that the animal should be shod in accordance with the work that he is expected to perform. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 404. Price 10 cents. To be had at this office and from all newsdealers.

**PATENT EYE AND SPRIGGLE.**  
**MUNSON BROTHERS,**  
MANUFACTURERS.  
OUR MILL STONES, MILL MACHINERY, AND MILL FURNISHINGS, UTICA, N. Y., U. S. A.

**WANTED.**—A First-Class Mechanical Draughtsman for a machine shop in Chicago. He must have had experience and be capable of figuring materials. He must also be active and not over 35 years of age. A good salary and a permanent position to the right man. Address **MECHANICAL DRAUGHTSMAN, Box 773, New York,** giving experience and references.

**EXPLOSIVE COMPOUNDS.—EXTRACT** from an address by Sir Frederick Abel, discussing some of the important changes that have been introduced into the manufacture of explosives. Contains sixes: Blasting powders, Powder without sulphur, Explosive powders, White gunpowder, Gun cotton, Modern projectiles and powder charges. Heat and uses of powder. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 406. Price 10 cents. To be had at this office and from all newsdealers.

**FIRE BRICK.** THE AND CLAY RETORTS ALL SHAPES.  
**BORGNER & O'BRIEN**  
23 - ST. ABOVE RACE, PHILADELPHIA.

SPEAKING TELEPHONES.

**THE AMERICAN BELL TELEPHONE COMPANY,**  
**W. H. FORBES, W. R. DRIVER, THEO. N. VAIL,**  
President, Treasurer, Gen. Manager.  
Alexander Graham Bell's patent of March 7, 1876, owned by this company, covers every form of apparatus, including Microphones or Carbon Telephones, in which the voice of the speaker causes electric undulations corresponding to the words spoken, and which undulations produce similar articulate sounds at the receiver. The Commissioner of Patents and the U. S. Circuit Court have decided this to be the true meaning of his claim; the validity of the patent has been sustained in the Circuit on final hearing in a contested case, and many injunctions and final decrees have been obtained on them. This company also owns and controls all the other telephonic inventions of Bell, Edison, Berliner, Gray, Blake, Phelps, Watson, and others.  
(Descriptive catalogues forwarded on application.)  
Telephones for Private Line, Club, and Social systems can be procured directly or through the authorized agents of the company.  
All telephones obtained except from this company, or its authorized licensees, are infringements, and the makers, sellers, and users will be proceeded against. Information furnished upon application.  
Address all communications to the  
**AMERICAN BELL TELEPHONE COMPANY,**  
95 Milk Street, Boston, Mass.

**THE HOLLAND LUBRICATOR, VISIBLE DROP.**  
Is guaranteed to be  
1. A perfect insurance against the cutting of valves, cylinder and Governor Valves of the engine.  
2. It will pay for itself in less than a month, in the saving of oil, coal, and packing.  
3. It will increase the speed in the revolutions of the engine, say from one to two strokes per minute, thus increasing the power of the engine.  
Mfg'd by Holland & Thompson, 211 River St., Troy, N. Y.

**THE BALLOU M'FG CO.,**  
Makers of Fine Machinery, Correct Leading Screws, and Instruments of Precision; Astronomical Clocks, Mathematical and Scientific Apparatus, etc.  
**HARTFORD, CONN.**

**RECENT EXPERIMENTS AFFECTING** the Received Theory of Music.—An interesting paper, detailing the results of a series of experiments of Prof. Morton with Koenig's tuning forks in order to prove the incorrectness of Helmholtz's statement that beats do not coalesce into musical sounds. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 401. Price 10 cents. To be had at this office and from all newsdealers.

**SWEEPSTAKES, WITH THE ELLIS** Patent Journal Box. The best Planer and Matcher ever made. Planing 34 in. wide, 6 in. thick, weight 2,300 lb., \$300; planing 30 in. wide, 6 in. thick, weight 2,500 lb., \$350. Beading, Arbor, and Head, extra, \$30. Sash, Door, and Blind Machinery a specialty. Correspondence solicited. **Rowley & Hemanee, Williamsport, Pa.**

**Lincoln Safe Deposit Co.**  
**AND STORAGE WAREHOUSE,**  
32 TO 38 EAST 42d St.  
(OPPOSITE GRAND CENTRAL DEPOT).  
**BUILDING FIREPROOF THROUGHOUT.**  
Burglarproof Boxes and Safes Rented at from \$10 to \$300 per year.  
THE BEST OF FACILITIES FOR GENERAL STORAGE.  
**TRUNK STORAGE A SPECIALTY.**  
BUILDING APPROVED BY FIRE COMMISSIONERS AND INSPECTOR OF BUILDINGS.  
**THOS. L. JAMES, President.**

**MALLEABLE** AND FINE GRAY IRON, ALSO STEEL CASTINGS FROM SPECIAL PATTERNS.  
**THOMAS DEVLIN & CO.,**  
FINE TURNING, PLANING AND GRINDING.  
LEHIGH AVE. & AMERICAN ST. PHILA.

**FOSSIL MEAL COMPOSITION,**  
The Leading Non-Conducting Covering FOR BOILERS, PIPES, ETC.  
With 1/2 to 1/4 inch thickness it radiates less heat than any other covering does with 2 inches.  
Weighs very light, is very durable, fireproof, and is easily applied. Sold in a dry state by the pound.  
Fully indorsed by Professor Ordway, Massachusetts Institute of Technology, Boston.  
**FOSSIL MEAL CO., 48 Cedar St., New York.**

**Telegraph and Electrical SUPPLIES**  
Medical Batteries, Inventors' Models, Experimental Work, and fine brass castings. Send for Catalogue **C. E. JONES & BRO., Cincinnati, O.** This important to us that you mention this paper.

**SOUTHWARK FOUNDRY & MACHINE COMPANY,**  
430 Washington Avenue, Philadelphia,  
**Engineers & Machinists,**  
Blowing Engines and Hydraulic Machinery. Sole makers of the Porter-Allen Automatic Cut-Off Steam Engine.

**OUR PATENT SAW MILL**  
Address: **TAYLOR MFG. CO., Chambersburg, Pa.**  
(Please mention this paper.)

**METAL WORKING MACHINERY**  
LATEST IMPROVEMENTS.  
**GOULD & EBERHARDT,**  
NEWARK, N. J.

**DEAFENING**  
FIRE AND VERMIN PROOF  
Sample and Circular Free by mail.  
**U. S. MINERAL WOOL CO., 22 Courtlandt St., N. Y.**

**ROOFING.**  
For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free. Agents Wanted. **1. NEW, 31 John Street, New York.**

**THE BIGGEST THING OUT** Illustrated Book Sent Free.  
(new) **E. NASON & CO., 120 Fulton St., New York.**

**DESCRIPTIVE CIRCULARS ON APPLICATION**  
**HALL & SONS**  
BUFFALO, N. Y.  
**SPRAY FEED WATER PURIFIER**  
FOR STEAM BOILERS  
U. S. & FOREIGN PATENTS

PATENTS.

**MESSRS. MUNN & CO.,** in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine Improvements, and to act as Solicitors of Patents for Inventors.  
In this line of business they have had thirty-eight years' experience, and now have unequalled 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 entrusted to them is done with special care and promptness, on very 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.