

"THE CIVIL WAR,"

IN THE CENTURY.



A series of graphically illustrated papers on the great battles of the Civil War, written by generals high in command upon both sides (including Generals Grant, Longstreet, McClellan, Beauregard, Hill, Pope, Rosecrans, Admiral Porter, and many others), is begun in the November number of THE CENTURY MAGAZINE with an article on

"BULL RUN"

By Gen. G. T. BEAUREGARD.

The aim is to present interesting personal experiences, with full and accurate illustrations.

Accompanying papers on "Recollections of a Private" will add value to a series which the conductors of THE CENTURY believe to be the most important ever undertaken by them. In the December number is a fine portrait of General Grant, and an article on

FORT DONELSON, by Gen. WALLACE.

This number also contains a capital short story by Mark Twain, and many other features. In an early issue will appear the paper on "SHILOH," by Gen. GRANT.

Begin subscriptions with November, and get first chapters of Howells's new novel of an American business man. Price \$4.00 a year, 35 cents a number. THE CENTURY CO. N. Y.

APPARATUS FOR ELECTRICAL MEASUREMENTS.—Illustrations and description of the various interesting apparatus for measuring electricity that were shown at the Munich Exhibition, including Wiedemann's bifilar galvanometer; Wiedemann's galvanometer for strong currents; Zenger's differential photometer; Von Beetz's solenoid; apparatus for demonstrating the principle of the Gramme machine; Van Rysseberghe's thermograph; Von Beetz's chronograph; and Harlaicher's apparatus for studying deep currents. Illustrated with seventeen engravings. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 421. Price 10 cents. To be had at this office and from all newsdealers.

SAVE MONEY BY SENDING FOR A COPY OF OUR before buying your Christmas Presents. Whether for young or old, nothing is so sure to please as a handsome book, and our catalogue places an almost endless variety before you below the regular retail price. We will send a copy by mail FREE to any address. **ESTES & LURIE**, 301-305 Washington St., opp. "Old South," Boston, Mass.

COE BRASS MFG CO. BRASS TORRINGTON. CONN. WIRE AND COPPER MATERIALS FOR METALLIC SHEETS. AMMUNITION A SPECIALTY. BLANKS

THE CORINTH CANAL.—A description of the project of Mr. B. Gerster, engineer in chief of the International Corinth Canal Company, and a sketch of the progress thus far accomplished. Nature of the isthmus of Corinth. Former undertakings. Route selected by Mr. Gerster. Mode of excavating. Apparatus employed. Illustrated with 6 engravings. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 425. Price 10 cents. To be had at this office and from all newsdealers.

AMERICAN Electrical Exhibition

TO BE HELD IN
Mass. Charitable Mech. Ass'n Bldg.,
HUNTINGTON AVE., BOSTON, MASS.

TO OPEN
Monday, Dec. 1, 1884.

TO CLOSE
Saturday, Jan'y 3, 1885.

SPECIAL NOVELTIES MAY STILL OBTAIN SPACE.

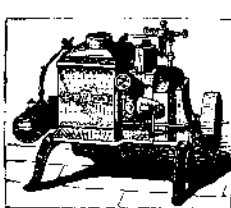
"CHAMPION" "6-LEVER" RIM NIGHT LATCHES. See illustration in SCI. AM. Nov. 29, 1884. Each is packed separately, with three nickel plated steel keys, and complete trimmings. Sample, with bronze escutcheon, mailed for introduction, on receipt of \$2.50. Full nickel plated sample for \$3.50. Add 10 cents for registering the package. (Order direct, or through any responsible dealer. Send 2c. stamp for Illustrated List of Latches, Locks, Padlocks, etc. Address Miller Lock Co., Philadelphia, Pa.)

NORDENSKJOLD'S GREENLAND EXPEDITION OF 1883.—An interesting resumé of the results reached by Baron Nordenskjöld during his recent expedition to Greenland; giving a description of the country traversed, and of the animals, plants, and minerals that were found, etc. Illustrated with a sketch map of the journey. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 422. Price 10 cents. To be had at this office and from all newsdealers.

THE LAWSON NON-EXPLOSIVE BOILER. This is the only steam boiler ever devised in strict compliance with the demands of natural laws. It gives complete immunity against explosions, delivers dry steam, prevents all incrustation and deposit on the bottom plates, affords safety with high pressure, and secures great economy. The invention is applicable to every style of boiler, and can be readily applied, internally or externally, to new or old boilers. Licenses granted on liberal terms to manufacturers. Send for description. **LAWSON NON-EXPLOSIVE BOILER CO.,** 153 and 157 Broadway, N.Y.

A. A. GRIFFING IRON CO. STEAM HEATING APPARATUS. SOLE MANUFACTURERS. **BUNDY STEAM RADIATOR** 750 COMMUNIPAW AVE. JERSEY CITY, N.J.
See illus. article in SCIENTIFIC AMERICAN Sept. 18, 1884.

OTTO GAS ENGINE OVER 10,000 IN USE
WORKS WITHOUT ENGINEER OR BOILER. STEAM COAL OR ASH. STARTS AT ONCE AND IS FREE OF DANGER FIRE OR EXPLOSION. 1 to 25 HORSE POWER. **SCHLEICHER SCHUMM & CO.** 47 DEY ST. NEW YORK. 214 RANDOLPH ST. CHICAGO. 332 & WALNUT STS. PHILADELPHIA



SHIPMAN STEAM ENGINE.

A BOAT AND STATIONARY ENGINE.

No skilled attendant required! Safe from fire and explosion! No expense when engine stops!

—Steam in FIVE minutes.—

Runs ten hours on less than 3 Gallons of Kerosene. See illustrated article in this paper, September 13.

SHIPMAN ENGINE CO. 55 Franklin St., Boston

PRICES

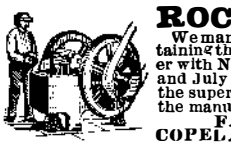
Including crating, and free delivery cars or to express company's office from any one of our agencies or factories.

ENGINE No. 1, 1/2 to 1/4 H.P. \$100

" No. 2, full 1 H.P. 125

" No. 3, full 2 H.P. 175

Illustrated Catalogues on receipt of stamp.



ROCK BREAKERS AND ORE CRUSHERS.

We manufacture and supply at short notice and lowest rates, Stone and Ore Crushers containing the invention described in Letters Patent issued to E. W. Blake, June 15th, 1883, together with NEW AND VALUABLE IMPROVEMENTS, for which Letters Patent were granted May 11th and July 20th, 1880, to Mr. S. I. Marsden. All Crushers supplied by us are constructed under the superintendence of Mr. Marsden, who, for the past fifteen years, has been connected with the manufacture of Blake Crushers in this country and England.

FARREL FOUNDRY AND MACHINE CO., Manufacturers, Ausonia, Conn.

COPELAND & BACON, Agents, New York.



NEW YORK BELTING & PACKING CO.

The Oldest and Largest Manufacturers of the Original

SOLID VULCANITE Emery Wheels.

All other kinds Imitations and Inferior. Our name is stamped in full upon all our standard BELTING, PACKING, and HOSE. Address

JOHN H. CHEEVER, Treas. New York Belting and Packing Co.,

JOHN D. CHEEVER, Treas. Dep. Warehouse, 15 Park Row, opp. Astor House, N. Y.

Branches: 308 Chestnut Street, Phila., 151 Lake Street, Chicago, and 52 and 54 Summer Street, Boston.



STEAM LAUNCHES.

Boat Engines and small Steamboat Machinery of all kinds. Launches constantly on hand.

Send for free illustrated Catalogue. **CHAS. F. WILLARD & CO.,** 282 Michigan St., CHICAGO.



BARNES'

Patent Foot and Steam Power Machinery.

Complete outfit for Actual Work.

Run in a 1/2 inch.

For Wood or Metal Circular Saws.

Sawmill Saws, Planers, Mortisers, Tenoners, etc., etc. Machines on trial if desired. Descriptive Catalogue and Price List Free. **W. F. & JOHN BARNES,** No. 1999 Main St., Rockford, Ill.

DR. KARL WEDL, PROFESSOR OF Histology in the University of Vienna.—Biographical sketch, accompanied with portrait. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 426. Price 10 cents. To be had at this office and from all newsdealers.

THE CAMERON STEAM PUMP.

STANDARD OF EXCELLENCE.

30,000 IN USE.

MANUFACTURED SOLELY BY

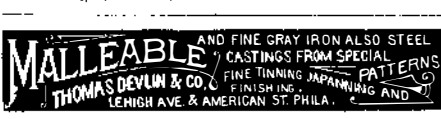
The A. S. CAMERON STEAM PUMP WORKS, Foot East 23d St., New York.

FREE HOLIDAY PACKAGE.

To introduce our goods and secure future trade, we will send you (free of charge) if you will send 40 cents in stamps for postage, etc., 5 pretty Christmas Cards, 5 nice New Year Cards, 5 lovely Birthday Cards, a beautiful Gift Bound Annual Autograph Album illustrated with birds, flowers, ferns, etc., a handsome Photographic Album of all the Presidents of the United States with autograph signature of each, also, Our New Illustrated Holiday Book. **U. S. MANUFACTURING CO.,** Hartford, Conn.

WATCHMAKERS.

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



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 a well equipped 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 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, 361 Broadway, New York.

BRANCH OFFICE.—Corner of F and 7th Streets, Washington, D. C.



OUR WATERBURY TIMEKEEPER.

Everyone can now own a PERFECT TIMEKEEPER. It is NO HUMBUG or cheap toy, but a reliable teller of the time of day in a Handsome Silver Nickel Hunting Case, and fully warranted. Cheap timekeepers, but reliable upon. We want 100,000 new readers for our paper, and to obtain them we make this special offer: For 40 cts. (or 20 cts. stamp) we will send our family story paper, entitled ILLUSTRATED LITERARY HOUR for 3 MONTHS as trial, and FIVE FREE our Waterbury Timekeeper in an ELIANT GOLD AND VELVET JEWEL CASE. For the extra we will send a Fine Plated Watch Chain with a Key Charm. For a club of three and \$1.00 we will send 3 subscriptions, and 3 timekeepers as premium. Money refunded if not as described. Address **LEISURE HOUR PUBLISHING CO.,** 288 Clark Street, CHICAGO, ILL.

FINISHED PULLEYS

AT 4 CTS. PER POUND,

TO CLOSE OUT STOCK ON HAND.

SEND FOR PRINTED LIST OF DIMENSIONS.

THE JOHN T. NOYE MFG. CO., BUFFALO, N. Y.

LOUIS PASTEUR.—BIOGRAPHICAL

sketch and full page portrait of this eminent scientist. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 335. Price 10 cents. To be had at this office and from all newsdealers.

THE PAYNE AUTOMATIC ENGINE

Gives more power from same amount of fuel and water than any engine



made, and 50 per cent more power than rated at. All engines warranted. All sizes and styles, 2 to 250 horse power. Send for prices and catalogue A 4.

B. W. PAYNE & SONS, Elmira, N. Y.

P. O. Box 1207.

SCIENTIFIC AMERICAN SUPPLEMENT.

Any desired back number of the SCIENTIFIC AMERICAN SUPPLEMENT can be had at this office for 10 cents. Also to be had of newsdealers in all parts of the country.

The New Catalogue of Valuable Papers

contained in SCIENTIFIC AMERICAN SUPPLEMENT, sent free of charge to any address.

MUNN & CO., 361 Broadway, N. Y.

PERFECT NEWSPAPER FILE

The Koch Patent File, for preserving newspapers, magazines, and pamphlets, has been recently improved and price reduced. Subscribers to the SCIENTIFIC AMERICAN and 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

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., 22 Cortland St., 9 Dey St.,

COOKE & CO., Selling Agts., 22 Cortland St.,

JAS. BEGGS & CO., Selling Agts. 9 Dey Street,

NEW YORK.

SEND FOR PRICED CATALOGUE

HOUSE DRAINAGE AND REFUSE.

Abstract of a lecture by Capt. Douglas Galton, C.B., on the treatment of town, barrack, and camp refuse, and on the removal of excreta from houses. A valuable paper. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 421. Price 10 cents. To be had at this office and from all newsdealers. The same number contains a valuable paper on the construction of privy vaults. Illustrated with three engravings.

Synapse Malleable Iron Works.

A CHRISTMAS GIFT.

Every Christmas we make the little folks a Christmas present. This year we have something new and pretty. To introduce our goods in every name we will send to any boy or girl free of charge, if you will send 2c. for postage, 4c. 3 Pretty Dolls with beautiful likeable features, one little boy and two girls dolls with a complete wardrobe of 32 pieces, dresses, hats, cloaks, etc., one elegant girl's head 2 1/2 inch. Autograph. All Christmas Cards, one pretty little girl Card and a 5c. Holiday Book. **A. L. BABCOCK & CO.,** Centerville, Conn.



REARING OYSTERS.—A VALUABLE

and interesting paper by John A. Ryder, describing the author's experiments in rearing oysters on a large scale from artificially fertilized eggs; followed by notes on pond culture, on the food of the oyster, on the oyster's enemies, parasites and commensals, etc. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 422. Price 10 cents. To be had at this office and from all newsdealers.

OPIUM

& WHISKY HABITS cured with Double Chloride of Gold. We challenge investigation. 10,000 Cures. Books free. **THE LESLIE E. KEELY CO.,** DUNSTON, ILL.

RIPON CATHEDRAL.—FULL PAGE

illustration and brief description of this ancient English ecclesiastical structure. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 335. Price 10 cents. To be had at this office and from all newsdealers.

VICOR

For Men. Quick, sure, safe. Book free. **Clavie Agency, 160 Fulton St., New York.**



ELECTRO-MAGNETISM AS A PRIME

Mover.—An account of the various attempts that have been made to utilize electro-magnetic power as a prime mover. Schultze's machine. Salvatore dal Negro's apparatus. Jacob's apparatus. Davidson's apparatus. Devenport's devices. Capt. Taylor's electro-magnetic engine. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 359. Price 10 cents. To be had at this office and from all newsdealers.

FOREIGN PATENTS.

Their Cost Reduced.

The expenses attending the procuring of patents in most foreign countries having been considerably reduced, the obstacle of cost is no longer in the way of a large proportion of our inventors patenting their inventions abroad.

CANADA.—The cost of a patent in Canada is even less than the cost of a United States patent, and the former includes the Provinces of Ontario, Quebec, New Brunswick, Nova Scotia, British Columbia, and Manitoba.

The number of our patentees who avail themselves of the cheap and easy method now offered for obtaining patents in Canada is very large, and is steadily increasing.

ENGLAND.—The new English law, which went into force on Jan. 1st, enables parties to secure patents in Great Britain on very moderate terms. A British patent includes England, Scotland, Wales, Ireland, and the Channel Islands. Great Britain is the acknowledged financial and commercial center of the world, and her goods are sent to every quarter of the globe. A good invention is likely to realize as much for the patentee in England as his United States patent produces for him at home, and the small cost now renders it possible for almost every patentee in this country to secure a patent in Great Britain, where his rights are as well protected as in the United States.

OTHER COUNTRIES.—Patents are also obtained on very reasonable terms in France, Belgium, Germany, Austria, Russia, Italy, Spain (the latter includes Cuba and all the other Spanish Colonies), Brazil, British India, Australia, and the other British Colonies.

An experience of THIRTY-EIGHT years has enabled the publishers of THE SCIENTIFIC AMERICAN to establish competent and trustworthy agencies in all the principal foreign countries, and it has always been their aim to have the business of their clients promptly and properly done and their interests faithfully guarded.

A pamphlet containing a synopsis of the patent laws of all countries, including the cost for each, and other information useful to persons contemplating the procuring of patents abroad, may be had on application to this office.

MUNN & CO., Editors and Proprietors of THE SCIENTIFIC AMERICAN, cordially invite all persons desiring any information relative to patents, or the registry of trade-marks, in this country or abroad, to call at their offices, 361 Broadway. Examination of inventions, consultation, and advice free. Inquiries by mail promptly answered.

Address, **MUNN & CO.,** Publishers and Patent Solicitors, 361 Broadway, New York.

Branch Office, cor. F and 7th Streets, opposite Patent Office Washington, D. C.