

Advertisements.

ORDINARY RATES.

Inside Page, each insertion, - 75 cents a line
Back Page, each insertion, - \$1.00 a line

The above are charges per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type.



OVERMAN WHEEL CO.

BOSTON. WASHINGTON. DENVER. SAN FRANCISCO.
A. G. SPALDING & BROS., Special Agents, CHICAGO. NEW YORK. PHILADELPHIA.

COLD FORGED PRODUCT.

Forged Wood Screw

Patented May 10, July 19, 1887; Oct. 29, 1889; Aug. 19, Oct. 21, 1890; April 7 May 12, 1891; July 19, 1892.

Its Advantages are:

- 1. Stronger than a common screw.
2. Uniform and wide slot.
3. Requires the use of but one bit in hard wood.
4. Inserted easier.
5. Centralized point.
6. Superior holding power.
7. The screw being Cold Forged, instead of Cut, leaves on its entire surface a metallic skin.

AMERICAN SCREW CO. PROVIDENCE, R. I.

THE WILMOT & HOBBS MFG. COMPANY

ESPECIALLY SOLICIT ORDERS FOR SOFT AND EXTRA SOFT
HOT ROLLED BAND, STRIP
AND PLATE STEEL.

SAWS Wanted 50,000 Sawyers SAWS
send us their full address for a copy of Em-
erson's Book of SAWS, new 1892 edi-
tion. We are first to introduce NATURAL
GAS for heating and tempering SAWS with
wonderful effect upon improving their qual-
ity and toughness, enabling us to reduce
prices. Address: E. H. WILSON, MITH &
CO. (Limited), Beaver Falls, Pa.

RIEDLER ENGINES AND
PUMPING ARE POSITIVELY BETTER
AIR COMPRESSORS THAN ANY OTHERS
UPON THE MARKET.
FOR EVIDENCE OF THIS FACT WRITE FOR PARTICULARS TO
FRASER & CHALMERS
133 FULTON ST. W. CHICAGO, ILL.

Boiled baby
was the preference of Charles Lamb.
A lady asked him: "How do you
like babies?" He replied: "Boiled,
madam." This bachelor sarcasm
perhaps arose from the idea of
some fond parents that fine clothes
make a fine baby; they don't. It
is the little fellow inside of the
clothes, who has only one tooth
and a spectacular smile, dimpling
off at the ends of his toes. Pretty
dress completes the charm—as it
does with everything. Even a
watch should have a handsome out-
side; but the main point is the time
it keeps. You find all this in the
new, quick-winding Waterbury.
All jewelers sell it. All styles, \$4 to 25.

PATENTS!
MESSRS. MUNN & CO., in connection
with the publication of the SCIENTIFIC
AMERICAN, continue to examine improve-
ments, and to act as Solicitors of Patents
for Inventors.
In this line of business they have had forty-five 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,
Reports on Infringements of Patents. All business intru-
sted to them is done with special care and prompt-
ness, on very reasonable terms.
A pamphlet sent free of charge, on application, contain-
ing full information about Patents and how to pro-
cure 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 OFFICES.—Nos. 622 and 624 F Street, Pa-
cific Building, near 7th Street, Washington, D. C.



"IMPROVEMENT THE ORDER OF THE AGE."
The Smith Premier Typewriter
Embodies the most Progressive Mechanical Principles.
All the Essential Features Greatly Perfected.
Perfect and Permanent Alignment.
Easiest Running, and Nearly Silent.
All type cleaned in Ten Seconds without Soiling the Hands.
The Smith Premier Typewriter Co., Syracuse, N. Y., U. S. A.
We have 20 branch offices in the principal cities throughout the United States.

No one ever wrote 1000 Letters an Hour,
that is, unless they first wrote one and then copied the rest on an
EDISON MIMEOGRAPH
Invented by Thos. A. Edison. For Daily Office Use in duplicating both handwriting and typewriting
Anybody can operate it. Simple—Compact—Cheap—Endorsed by over 90,000 users.
Catalogues and Samples of Work sent free upon application. Manufactured only by the A. B. DICK
CO., 134 E. Lake St. Chicago. Branch Offices, 47 Nassau St., N. Y. City, 117 So. Fifth St., Phila.

KODAKS.

Take one with You
to the World's Fair.
They're the only practical camera for the purpose.
No bulky glass plates—no troublesome holders—no
need of hunting up a dark room. With our special
Columbian spools of film, containing 200 exposures
you can have your Kodak loaded before leaving
home and can then "press the button" as often as
you like, while at the Fair without the necessity
of reloading.
Eastman Kodak Co.,
Rochester, N. Y.

FASTEST FINE GRINDER KNOWN
VERTICAL ROCK EMERY MILL
STURTEVANT MILL CO. Boston, Mass.

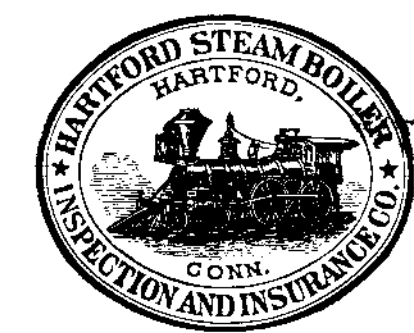
H. W. JOHNS' Liquid Paints
These Paints are composed of pure linseed
oil and the highest grade of pigments. They are
combined by processes exclusively our own and are unequalled by any in richness and permanency of
color. One gallon will cover from 275 to 300 square feet. Two coats without thinning and can be
safely thinned with 1/2 gallon linseed oil to one gallon paint for first coat.
SAMPLE CARD OF 56 SHADES, INSTRUCTIONS FOR USE AND SUGGESTIONS FOR PAINTING ETC. FREE BY MAIL.
NEW YORK JERSEY CITY CHICAGO
PHILADELPHIA BOSTON ATLANTA
H. W. JOHNS MFG CO.

ZINC ETCHING
HALFTONE PROCESS
Printer
OF
Engravings MAGAZINES,
BOOKS,
CATALOGUE WORK SOUVENIRS.
A SPECIALTY
A. H. KELLOGG
SCOTT & BOWNE BUILDING
New York.

ALL ARITHMETICAL
PROBLEMS
solved rapidly and accurately
by the Comptometer. Saves
60 per cent of time and entire-
ly relieves mental and ner-
vous strain. Adapted to all
commercial and scientific
computation. Why don't you
get one? Write for pamphlet.
FELT & TARRANT MFG. CO.
52-56 ILLINOIS ST. CHICAGO.

AGENTS WANTED FOR FINE TOOLS IN EVERY SHOP.
C. H. BESLEY & CO.
CHICAGO, ILL. U.S.A.

\$20 Buy Direct and Save 50 Per Cent.
All riders say they cannot see how
we can do it for the money: \$20
buys an elegant Oxford finely
finished and nickel plated Bicycle,
warranted to be first class, simple
in construction, strong, durable
and accurately fitted, which makes
riding our Wind & pleasure
guaranteed. Write today for our illustrated FREE catalogue.
DEPT. B.—OXFORD MFG. CO. 338 WABASH AVE. CHICAGO.



THE COPYING PAD.—HOW TO MAKE
and how to use; with an engraving. Practical directions
how to prepare the gelatine pad, and also the aniline ink
by which the copies are made, how to apply the written
letter to the pad, how to take off copies of the letter.
Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No.
438. Price 10 cents. For sale at this office and by all
newsdealers in all parts of the country.

SEND FOR OUR CIRCULAR.
IN ONE MINUTE
IT WILL CONVINCING YOU OF OUR ABILITY TO SUPPLY
TOILET PAPER FOR LESS MONEY THAN IT CAN BE OB-
TAINED ELSEWHERE. A. P. W. PAPER CO. ALBANY, N.Y.

COMPLETE ELECTRICAL EQUIPMENTS
—FOR—
ARC OR INCANDESCENT LIGHTING.
Arc Lamps. Incandescent Lamps. House Wiring Appliances.
MINIATURE LAMPS FOR DECORATIVE PURPOSES.
GENERAL ELECTRIC COMPANY,
DISTRICT OFFICES:
44 Broad Street, New York. 620 Atlantic Avenue, Boston, Mass.
173 and 175 Adams Street, Chicago, Ill. 509 Arch Street, Philadelphia, Pa.
Fifth and Race Streets, Cincinnati, O. 401-407 Sibley Street, St. Paul, Minn.
Equitable Building, Atlanta, Ga. 1333 F Street, N. W., Washington, D. C.
15 First Street, San Francisco, Cal. Masonic Temple, Denver, Colo.
All business outside the U. S. transacted by Thomson-Houston International Electric Co. 44 Broad St. New York

CASH PAID for all kinds of good Second-hand
Iron and Wood-Working Machinery.
Address W. P. DAVIS, ROCHESTER, N. Y.



Three Columbias
There is something about Co-
lumbias different from all other
bicycles—it is superlative quality
—The Columbia guarantee is as
good as gold.
Catalogue free at Columbia agencies, by
mail for two-cent stamps. Pope Mfg.
Co., Boston, New York, Chicago, Hart-
ford.

Greenfield Yacht Engine
3 to 5 H. P. Price \$120.
Thoroughly adapted for Steam Launches,
Pleasure Yachts, Tug Boats, and other
small steamers. Simple and easily managed.
Occupies very small space. 19 years on
the market. Send for Circulars.
W. G. & G. GREENFIELD,
EAST NEWARK, N. J.

LINK-BELT MACHINERY CO.
Engineers, Founders, and Machinists,
CHICAGO.
Exclusive manufacturers of the
Original Ewart Link Belting. Made
in 31 regular sizes.
Machinery for handling all
kinds of Freight, Cereals, Ores,
Refuse, etc. Manila Rope
Power Transmissions, Shafting,
Pulleys, Hangers, Gearing, Sheaves, Fly Wheels, etc.

THE CHASE WOOD RIM PULLEY
ALL IRON RIM
BORED TO SHAFT SIZE KEYS AND SET
SCREWS SAME AS AN ALL IRON PULLEY. LARGE
PULLEYS FOR ANY AMOUNT OF HORSE POWER
A SPECIALTY SEND FOR DESCRIPTIVE CIRCULAR TO
F. A. CHASE & CO. MFRS. 7 EDDY ST. PROVIDENCE R.I.

The American Bell Telephone Company
125 MILK ST., BOSTON, MASS.

This Company owns the Letters Patent
No. 186,787, granted to Alexander Graham
Bell, January 30, 1877, the scope of which
has been defined by the Supreme Court of
the United States in the following terms:
"The patent itself is for the mechan-
ical structure of an electric telephone to
be used to produce the electrical action
on which the first patent rests. The third
claim is for the use in such instruments
of a diaphragm, made of a plate of iron
or steel, or other material capable of in-
ductive action; the fifth, of a permanent
magnet constructed as described, with a
coil upon the end or ends nearest the
plate; the sixth, of a sounding box as de-
scribed; the seventh, of a speaking or
hearing tube as described for conveying
the sounds; and the eighth, of a perman-
ent magnet and plate combined. The
claim is not for these several things in
and of themselves, but for an electric tele-
phone in the construction of which these
things or any of them are used."
This Company also owns Letters Pa-
tent No. 463,569, granted to Emile Ber-
liner, November 17, 1891, for a Combined
Telegraph and Telephone; and controls
Letters Patent No. 474,231, granted to
Thomas A. Edison, May 3, 1892, for a
Speaking Telegraph, which cover funda-
mental inventions and embrace all forms
of microphone transmitters and of car-
bon telephones.

Motor of 19th Century
Can be used any place, to do any
work; and by any one. No Bol-
ler! No Fire! No Steam! No En-
gineer! No Gauges! No Engi-
neer! A perfectly safe Motor
for all places and purposes. Cost
of operation about one cent an
hour in each indicated horse power.
For circulars, etc. address
CHARTER GAS ENGINE CO.
P. O. Box 168, Sterling, Ill.

PRINTING INKS.
The SCIENTIFIC AMERICAN is printed with CHAS.
ENRU JOHNSON & CO'S INK, Tenth and Lombard
Sts., Philadelphia, and 47 Rose St., opp. Duane, New York