267

[OFFICIAL.]

Index of Inventions

FOR WHICH

Letters Patent of the United States were granted for the week ending September 23, 1873,

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]]
Acid, sulphuric, Thomson et al	[<u>1</u>
Adding machine, S. Pool 143,184 Atomizer or vaporizer, J. N. Gerard 143,076	ı I
Auger, hollow, Fawcett, Silver, & Deming. 143,133 Auger, well, W. L. Payne. 143,183	2 1
Bag holder, G. W. Stricker 143.19 Bail ear, metallic, T. Evans (r) 5,578	4 1
Bale tie, cotton, T. Cromer	1 1 9 1
Bed bottom, W. H. Sears 143,19 Bed bottom, W. W. Skaats 143,08	0 1
Beer cooler tap holder, J. H. Fisher 143,06	8 1
Blind stop, J. Weber 143,20' Boats, disengaging, Wygant et al. 148,05	0 :
Boats, attachment for, J. R. Adams	6 3
Boiler feed and blow off, Garsed & Buck 143,000 Bolt threading machine. M. Hine 143,15	4 1
Book, indexing, J. S. Hicks 143,07 Boot, L. H. Farnsworth 143,00	
Boot shanks, burnishing, A. C. Carey	
Box former, G. W. Swan 143,100	3
Bracelet, H. A. Williams	
Broom hanger, M. A. Clifford 143,06 Buckle, harness, O. B. North 143,18	3:1
Buckle, suspender, S. Hamm	4 , 1
Building articles, J. Rust 143,09 Building, fireproof, L. A. Tartière 143,19 Building, fireproof. L. A. Tartière 143,19	6
Button molds, making, J. T. Hawkins 143,07	3
Can, oil, O. H. Warren	8
Cane juice, extracting, D. Moffat	9 }
Car brake, E. O. Richard 148,18 Car coupling, W. A. Boyden 143,05	7
Car coupling, T. H. Cross	8
Car coupling, J. L. Duncan 142,59 Car coupling, J. F. L. Holman 143,01	1
Car coupling, G. E. Knox	9
Car coupling, A. Zeigler	
Cars, bending truck sides for, J. H. Helm 143,01 Carding machines, condenser for, N. Lucas 143,02	0 :
Carpet beater, J. Hothersall 143,15 Carpet lining, E. H. Bailey 144,05	i5
Carpet stretcher, H. Powelson 143.Carriage foot rail, T. W. & H. K. Porter. 143,03	32
Carriage holdback, D. Terry 143,19	99
Carriage top setter, J. Poffenbarger	77
Casting, core bar for, D. Gallagher	38
Clothes pin, H. Mellish 148,02 Coal scuttle, J. J. White 142,20	8
Cock, stop, C. W. Laurie 143,16 Coffin, F. Tighe 143,26	
Cooking apparatus, steam, J. Lungren	
Croze and howel, coopers', W. R. Davis. 142,95 Cultivator, W. Lewis. 143,01	95 !
Cultivator, E. P. Lynch	72 :
Diamond points, setting, W. McKenna 143,0.	41 }
Double tree, W. Martin	88
Drill for boring artesian wells, C. G. Cross	75
Elevator, G. W. Hubbard	13 43
Engine cylinder, steam, H. Gerner	
Engine, traction, L. Perkins 143,0 Envelope, L. Giebrich 143,1	28
Fabrics, fur coated, H. Kellogg. 143,1 Fan, automatic, O. Vanorman. 143,2	63
Faucet attachment, J. Church 143,0	62
Faucet, self-closing, J. W. Trafton	30 ļ
Fence, W. F. King 143,1 Fertilizing soils, J. B. Wilson 143,2	13
Filter, C. Anderson	
Fire escape, L. E. Ainsworth	
Fire kindler, J. C. Crompton	
Fork, horse hay, J. W. Lowe	70
Fruit basket, J. K. Parke	79
Furnace, smoke burning, S. A. Ford 143,0	04
Furnace, soldering, J. Day 143,1 Gaiter, W. E. Putnam 143,1	86
Game, West & Lee	.38
Gas fittings, etc., tapping, A. D. Laws 143,1 Gas retorts, charging, Somerville & Robinson 143,0	39
Generator, steam, R. Gerner	
Grate bar, H. E. Kerstine	
Gun cleaner, C. G. Gould 143,1 Harvester, T. Yates 143,	
Heater, feed water, J. V. Beekman	983
Hemp machine, J. E. Neill. 143,1 Hoisting machine, J. M. Yates. 143,2	179
Hook, bench, D. Bovce	054
Hydrocarbon, etc., burning, C. Carpenter, Jr 143, Ice breaker and fender, F. Ford 143,	003
Insect destroying compound, W. C. Bibb 142,5 Iron and steel, annealing, etc., A. F. Andrews 142,5	97°.
Jeweler's drilling device, J. K. Laudermilch 143, Jeweler's hand press, J. McWilliams 143,	084 023
Knittingmachine, C. H. Young	051
Ladder, fire escape, J. S. Pierson 143, Lamp, street, J. H. Eyrse 143,4	182
Lantern, W. J. Berry. 143, Leather, imitating, H. A. Clark 143,	984
Lock, seal, J. E. Thomson, 143, Mengle, R. A. Duncan 142,	201

Meat mangle, S. D. Ingham	43,158
Medical compound, J. Fehr 1	
Medical compound, U. H. Kellogg	43,164
Mill, fanning, L. D. Decker	
Mosquito canopy, W. Bourgnignon	48,119
Mowingmachine, H. Michaux	
Nail plate feeder, J. McNeely	
Nut lock, D. Sawyer	
Organ reeds, tongue for, M. Procopé	
Packing, piston, J. E. Budd	48,057
Picture frames, hanging, T. C. Barnard	42,981
Plane, bench, C. H. Hardy	143,072
Plane, rabbet, F. Smith	
Planing machine, metal, Kichner & Odenatt	143,080
Planter, corn, A. N. Smith	144,036
Planter, cotton seed and guano, C. G. Wilson	143,211
Plow, snow, W. J. Roberts	
Plow, wheel, J. D. Harrison	
Pot, coffee, M. J. Stubbings	148,102
Potato bug destroyer, W. H. Myers	
Pruning instrument, W. H. Collings	
Pruning shears, W. E. Ball	
Pump, barge, C. P. Gaver	149,100
Purifier, middlings, F. Bleckman	140,000
Purifiers, screen for middlings, W.W. Huntley	148 014
Railroad rail joint, H. Decker	149 996
Railroad time signal, H.H. Ford	
Rake and tedder, combined, C. La Dow	
Reapers, etc., coupling joint for, G. W. Sylvester	
Refrigerator, C. Camp	
Rein holder, Grannis & Fitch	143,140
Sash fastener, O. W. Noble	143,026
Sash holder, F. M. Davis	142,994
Saw, hand, T. S. Disston	143,118
Sawing machine, G. T. Riddle	143,038
Scales, weigning, W. Z. Conner	
Scraper, W. E. & F. A. Jacobs	
Separator, grain, J. Koons	
Sewing machine, J. P. Noyes	
Sewing machine fan, R. Jackson	
Sewing machine hemmer, J. F. Johnson	
Sewing machine quilter, W. H. Null	140.092
Sewing machine threader, T. Schofield Sewing machine shuttle, W. H. Thayer	140,090
Sewing machine thread cutter, A. Webber Sewing machine gatherer, J. Wise	140,040
Shaft, tumbling, D. Snell	
Sheet metal, riveting joints of, P. Ball	142.979
Shirt, W. B. Watson	
Shirt bosom and lung protector, W. R. Trask	143.205
Shoe fastening, G. B. Hart	143,148
Shovel, fire, F. M. Ketcham	
Shutter fastener and bower, R. Ruhlman	
Shutter, fireproof, T. Hyatt	143.156
Shutter, fireproof, T. Hyatt	143,157
Shutter worker, J. W. Jedkins	143,159
Sifter, sand, D. Brobston	
Skirt, W. S. Taylor	143,198
Skylight, G. Hayes	143,149
Skylight, G. Hayes	143,150
Skylight, G. Hayes	
Skylight cover, G. Hayes Skylight turret and conservatory, G. Hayes	
Sled, boy's, S. D. Mott	
Spear, casing, V. Gretter	
Spoon, trolling, Harper & Smith	
Steering apparatus, H. Keen	
Steering apparatus, W. E. Thomas	
Stove pipe connection, G. F. Brinkerhoff	
Strainer, cream, R. W. Barnard	
Streets of snow, clearing, W. E. Musgrove	
Stump extractor, W. Duffner	143,129
Sword blades, rolling, J. C. Richardson	143,094
Table, ironing, Grosh & Foreman	143,071
Table, work, J. P. Wilson	143,212
Tanning compound, W. Thilmany	143,105
Tent, J. B. Smith	
Thill coupling, H. B. Kinney	143,162
Trap, animal, D. A. Leach	
Toy dancer, automatic, H. L. Brower	
Toy whistle, J. Waters	
Tyre heater, R. F. Thompson	
Umbrella ribs, affixing bits to, A. Wilson	143.210
Valve, balanced, J. H. Stombs	143,198
Valve, governor, H. B. Weaver	
Vehicle spring, G. W. Lewis	
Vehicle wheel, R. R. Jones	
Vehicle wheel, R. R. Jones	
Vehicle wheel, T. W. Porter	
Vessel, covered, W. Bates	143,116
Vessels, raising sunken, L. W. Briggs	143,056
Vessels, propelling, L. Murdock	143,091
Vest, lady's under, O. P. Flynt	143,002
Violin, J. Belknap	
Wagon, T. W. Porter	
Wagon, F. Post	143,185
Wagon body, B. Burr	
Wagon boxes to bolster, holding, H. L. Anderson Wagon seat, M. Likes	
Washingmachine, A. M. Campbell	
Washing machine, Colvin & Patchen	
Washing machine, Colvin & Fatchen	148.17
Washing machine, F. M. Widerman	
Watchmaker's chain clamp, C. E. Evard	
Water cooler, I. Brach	
Water cooler, J. E. Cammeyer	143,058
Water wheel, J. Taney	143,040
Wheel, fly, H. Gerner	143,009
Whip, E. P. Couse.	143,06
Wick raiser, Hallas & Weeden	
Windmill, J. Q. & A. R. Adams	143,11
windhill J. Hoag	. 145,U7
Wind wheel, N. & D. Sheplar	149 10

APPLICATIONS FOR EXTENSIONS.

Applications have been duly filed, and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the dayshereinafter mentioned: 22,590.—CLARIFYING CANE JUICE.—R.A.Stewart. Dec.10. 26,584.—PLANING CURVES.—J. P. Grosvenor. Dec. 10.

22,590.—CLARIFYING CANE JUICE.—R.A.Stewart. Dec.10. 26,584.—PLANING CURVES.—J. P. Grosvenor. Dec. 10. 26,614.—POROUS WARE.—B. S. Pierce et al. Dec. 10. 26,627.—CUTTING VENEERS.—B. F. Sturtevant. Dec. 10. 26,679.—SEAMING MACHINE.—L. T. Hulbert. Dec. 17. 26,822.—CUTTING ROUND TENONS.—L. A. Dole. Dec. 24.

EXTENSIONS GRANTED.

25,565.—ROLLING MILL.—J. & G. Fritz.
25,569.—Bedstead Slat.—T. Howe.
25,570.—Car Couch.—E. C. Knight.
25,572.—Molding Water Traps.—J. A. Lowe.
25,586.—Burglar Allem.—A. Q. Ross.

DESIGNS PATENTED.

6,890.—TYPE.—E. C. Ruthven, Philadelphia, Pa. 6,891.—FURNITURE.—D. Shales & al., Boston, Mass.

6,892 & 6,893.—Түре.—R. Smith, Philadelphia, Pa. 6,894.—Спаігя.—J. M. Waters, Cincinnati, O.

TRADE MARKS REGISTERED.

1,461.—SILK FABBIOS, ETC.—Bernstein et al., N. Y. c.ty.
1,462.—HARD SOAP.—O.Cutts & Co.,PortAu Prince,Hayti.
1,463.—JOURNAL PACKING.—P.S. Devlan, N. Y. city.
1,464.—SAWS, ETC.—H.Disston & Sons, Philadelphia, Pa.
1,465.—SHIRTS.—Finlay et al, New York city.
1,466 & 1,467.—BOOT PEGS.—Kearsarge Peg Co., Andover,

1,468.—Liquors.—G. W. Kidd & Co., New York city.
1,469.—Clothing.—M. Newman et al, New York city.
1,470.—Teas.—Newton & Co., San Francisco, Cal.
1,471. & 1,472.—Leaf Tobacco.—Weiss et al., N. Y. city.

VALDE OF PATENTS

And How to Obtain Them.

Practical Hints to Inventors.



ROBABLY no investment of a small sum of money brings a greater return than the expense incurred in obtaining a patent even when the invention is but a small one. Large inventions are found to pay correspondingly well. The names of Blanchard, Morse, Bigelow, Colt, Ericsson, Howe, McCormick, Hoe and others, who have amassed immense fortunes from their inventions, are well known. And there are thousands of others who have realized large sums from their patents.

More than FIFTY THOUSAND inventors have availed themselves of the services of Munn & Co. during the TWENTY-SIX years they have acted as solicitors and Publishers of the SCIENTIFIC AMERICAN. They stand at the head in this class of business; and their large corps of assistants, mostly selected from the ranks of the ratent Office: men capable of rendering the best service to the inventor, from the experience place, cally obtained while examiners in the Patent Office: enables Munn & Co. to do everything appertaining to patents better and oheaper than any other reliable agency.

This is the

HOW TO OBTAIN This is the closing inquiry in nearly eve

ry letter, describing some mvention which comes to this office. A positive answer can only be had by presenting a complete application for a patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalitiesmust also be observed. The efforts of the inventor to do all this business himself are egnerally without success. After great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning. If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

How Can I Best Secure My Invention?

This is an inquiry which one inventor naturally asks another, who has had some experience in obtaining pat-

ents. His answer generally is as follows, and correct:
Construct a neat model, not over a foot in any dimension—smaller if possible—and send by express, prepaid, addressed to Munn & Co., 37 Park Row, together with a description of its operation and merits. On receipt thereof, they will examine the invention carefully, and advise you as to its patentability, free of charge. Or, if you have not time, or the means at hand, to construct a model, make as good a pen and ink sketch of the improvement as possible and send by mail. An answer as to the prospect of a patent will be received, usually, by return of mail. It is sometimes best to have a search made at the Patent Office; such a measure often saves the cost of an application for a patent.

Preliminary Examination.

In order to have such search, make out a written description of the invention, in your own words, and a pencil, or pen and ink, sketch. Send these, with the fee of \$5, by mail, addressed to Munn & Co., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. This special search is made with great care, among the models and patents at Washington, to ascertain whether the improvement presented is patentable.

To Make an Application for a Patent,

The aphlicant for a patent should furnish a model of his invention if susceptible of one, although sometimes it may be dispensed with; or, if the invention be a chemical production, he must furnish samples of the ingredients of which his composition consists. These should be securely packed, the inventor's name marked on them, and sent by express, prepaid. Small models, from a distance, can otten be sent cheaper by mail. The safest way to remit money is by a draft, or postal order, on New York, payable to theorder of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents.

s. Foreign Patents.

The population of Great Britain is \$1,000,000; of France, \$7,000,000; Belgium, 5,000,000; Austria, \$6,000,000; Prussia, 40,000,000,and Russia, 70,000,000. Patentsmay be secured by American citizens in all of these countries. Now is the time, when business is dull at home, totake advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. These will

neverbe a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. A large share of all the patents secured in foreign countries by Americans are obtained through our Agency. Address Munn & Co., 37 Park Row, New York. Circulars with full information on foreign patents. furnished free.

Rejected Cases.

Rejected cases, or defective papers, remodeled for parties who have made applications for themselves, or through other agents. Terms moderate. Address Munn & Co.. stating particulars.

Reissues,

A reissue is granted to the original patentee, his heirs or the assignees of the entire interest, when, by reason of an insufficient or defective specification, the origina patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application by paying the required fee in each case, and complying with the other requirements of the law, as in original applications. Address Munn & Co., 37 Park Row, New York, for full particulars.

Caveats.

Persons desiring to file a caveat can have the papers prepared in the shortest time, by sending a sketch and description of the invention. The Government fee for a caveat is \$10. A pamphlet of adviceregarding applications for patents and caveats is furnished gratis, on application by mail. Address Munn & Co. 37 Park Row New York

Canadian Patents.

On the first of September, 1872, the new patent law of Canada went into force, and patents are now granted to citizens of the United States on the same favorable terms as to citizens of the Dominion.

In order to apply for a patent in Canada, the applicant must furnish a model, specification and duplicate draw ings, substantially the same as in applying for an American patent.

The patent may be taken out either for five years (government fee \$20), or for ten years (government fee \$40) or for fitteen years (government fee \$60). The five and ten year patents may be extended to the term of fifteen years. The formalities for extension are simple and not expensive.

American inventions, even if already patented in this country, can be patented in Canada provided the American patent is not more than one year old.

All persons who desire to take out patents in Canada are requested to communicate with Munn & Co.. 37 Park Row, New York, who will give prompt attention to the business and furnish tull instruction.

Value of Extended Patents.

Did patentees realize the fact that their inventions are likely to be more productive of profit during the seven years of extension than the first full term for which their patents were granted, we think more would avail themselves of the extension privilege. Patents granted prior to 1831 maybe extended for seven years, for the benefit of the inventor, or of his heirs in case of the decease of fomer, by due application to the Patent Office, ninety days before the termination of the patent. The extended time intres to the benefit of the inventor, the assignees under the first erm having no rights under the extension except by special agreement. The Government fee for an extension is \$100, and it is necessary that good professional service be obtaine at o conduct the business before the Patent Office. Full information as to extensions maybe had by addressing Munn & Co., 37 Park Row, New York.

Trademarks.

Any person or firm domiciled in the United States, or any firmor corporation residing in any foreign country where similar privileges are extended to citizens of the United States, may register their designs and obtain protection. This is very important to manufacturers in this country, and equally so to foreigners. For full particulars address Munn & Co.. 37 Park Row. New York.

Design Patents.

Foreign designers and manufacturers, who send goods to this country, may secure patents here upon their new patterns, and thus prevent others from fabricating or selling the same goods in this market.

A patent for a design may be granted to any person whether citizen or alien, for any new and original design for a manufacture, bust statue, alto relievo, or bas relief any new and original design for the printing of woolen, silk, cotton, or other fabrics, any new and original impression, ornament, pattern, brint, or picture, to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture.

Design patents are equally as important to citizens as to foreigners. Forfull particulars send for pamphlet to Munn & Co., 37Park Row, New York.

Copies of Patents.

Persons desiring any patent issued from 1836 to Novem ber 26, 1867, can be supplied with official copies at a reasonable cost, the price depending upon the extent of draw

ings and length of specification.

Any patent issued since November 27, 1867, at which time the Patent Office commenced printing the drawing and specifications, may be had by remitting to this of fice \$1.

A copy of the claims of any patent issued since 1836 will be furnished for \$1.

When ordering copies, please to remit for the same as above, and state name of patentee, title of invention and date of patent. Address Munn & Co., Patent Solicitors 37Park Row, New York.

MUNN & Co. will be happy to see inventors in person, at their office, or to advise them by letter. In all cases they may expect an honest opinion. For such consultations, opinions, and advice, no charge is made. Write plain; do not use pencil or pale ink; be brief.

All business commuted to our care, and all consulta

tions, are kept secret and strictly confidential.

In all matters pertaining to patents, such as conducting interferences, procuring extensions, drawing assignments, examinations into the validity of patents, etc., special care and attention is given. For information and for pamphlets of instruction and advice

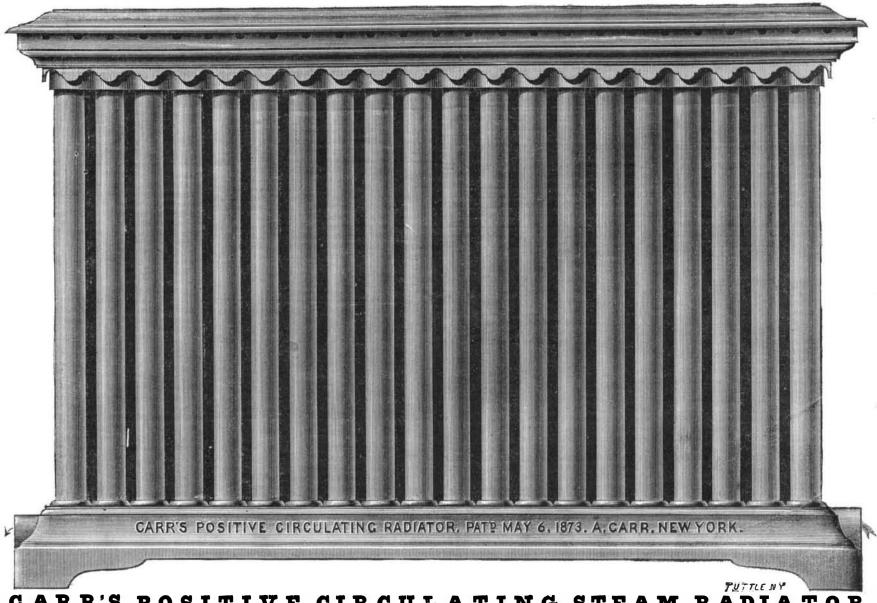
Address

MUNN & CO.,

PUBLISHERS SCIENTIFIC AMERICAN,

37 Park Row, New York.

OFFICE IN WASHINGTON—Corner F and 7th



CARR'S POSITIVE CIRCULATING STEAM RADIATOR. Send for Circular and Price List to A. CARR, 43 Courtlandt street, New York.

To Electro-Platers.

ATTERIES, CHEMICALS, AND MATE-RIALIS, in sets or single, with books of instruction for Nickel or Silver Plating, by THOMAS HALL, Manufacturing Electrician, 19 Bromfield Street, Boston, Mass. Illustrated catalogue sent free.

FOR SALE—A most important, useful and valuable invention. An independent fortune to any party who desires to handle. Applications should be made immediately. Address S., care G. E. HUTCH-INSON, 114 Superior Street, Cleveland, O.

TO MACHINISTS,
FOR SALE—One Cast Iron Fly Wneel Pulley, 12
feet dia., 24 in. face—boredfor 10 i1. sbaft—turned true—
in halves—weighs 7800 lbs. Price \$300.
76 feet 5 inch Wro't Iron Steam Pipe—flange joints—
wit. elbow. Price \$1.50 per foot.
120 feet 18 inch and 75 feet 24 inch best doubled and
pegged, cemented oak tanned Leather Belting, in good
order. Price 50 per cent from list. Also,
2 Single-flue Boilers, 22 inch dia., 22 feet long.
1 do. do 42 do 42 do 43 feet long.
For further information, address

For further information, address
MARSHALL P. MITH,
40 F. O. Avenue, Baltimore, Md

JUST PUBLISHED, A Fresh Work on Mining.

SILVER AND GOLD:

An Account of the Mining and Metallurgical Industry of the United States, with reference chiefly to the Precious Metals. By R. W. RAYMOND, Ph. D., U. S. Commissioner of Mining Statistics, President of the Am. Inst. of Mining Engineers, editor of "Engineering and Mining Journal," Author of "Mines of the West," "American Mines and Mining," "Mines of the West, "Mines and Mining," "Mines of the Mines and Mining, "Mines and Mining," "Mines of the Mines and Mining, "Mines and Mining, "Min

The energy and thoroughness with which Mr. Raymond has prosected his investigations, and the rare intelligence and intimate acquaintance with mining and metallurgy, manifested in nis writings on these subjects, have been widely acknowledged, and his reputation will ensure an interest in this, his latest work.

* * To be had of Booksellers, or will be sent to any address. post-paid, on receipt of price, by the Publishers,

1 Set of Steel Clamps \$12.50 1 Set of Steel Clamps \$12.50 Expanding Mandrels taking anything from ½ to 4 inches, &c. Send to C. W. LE COUNT, South Norwalk, Conn., for Circular,

\$10 to \$20 per day. Agents wented everywhere. Particulars free. A. H. BLAIR & CO., St. Louis, Mo. \$375 A MONTH to Male or Female Agents.
NOVELTY CO., Biddeford, Me.

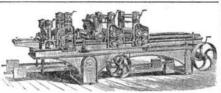
12 Samples sent by mail for 50 cts., that retail quick for \$10. R. L. WOLCOTT, 181 Chatham Square, New York.

WOODBURY'S PATENT Planing and Matching
and MoldingMachines, Gray & Wood's Planers, Self-oiling
Saw A bors, and other wood working machinery.
S. A. WOODS,
Send for Circulars. [67 Sudbury street, N.Y.;

Crown 8vo, Clo., Illustrated, \$2. Mail free-WORKSHOP RECEIPTS.

TO THE USE OF MANUFACTURERS, MECHANICS, and SCIENTIFIC AMATE URS; edited by
Ernest Spon. Containing Receipts for Bookbinding—
Candles—Cements—Concretes—Drawing Office Details—
Dyeing—Electro-Netallurgy—Enamels—Engraving on
Wood, Copper, Gold, Silver, Steel and Stone—Etching—
Fire works—Glass Cutting—Gums—Japans—Lubricants—
Marble Working—Nitro Glycerine—Paining in Oils, Water Colors, as well as Fresco, House, Transparency, Sign
and Carriage Painting—Photography—Pottery—Polishes
—Soap—Solders—Taxidermy—Varnishes—Veneering—
Waterproofing—Stencil Plates—Crayons, and others too
numerous to mention.

E. & F. N. SPON, 446 Broome St., N.Y.



Patent Woodworth, Daniels and Dimension Planers Moulding, Mortising, Tenoning and a great variety of other Machinery for Working in Wood. Sole Manufac turers of the celebrated Farmer Patent Matcher Heads and Antiriction Cutters and the New England Band Saw. Factory 26 Salisbury St., Worcester, Mass. Salesroom 121 Chambers & 108 Reade Sts., N. BALL & CO.

FOR SALE,

The energy and thoroughness with which Mr. Raymond has prosecuted his investigations, and the rare intelligence and intimate acquaintance with mining and metallurgy, manifested in his writings on these subjects, have been widely acknowledged, and alsereputation will ensure an interest in this, his latest work.

**To be had of Booksellers, or will be sent to any address. post-paid, on receipt of price, by the Publishers,

J. B. FORD & CO.,

27 Park Place, New York,

TOR SALE—State Rights to Manufacture the Metal Sash patented July 8, 1873. To parties wishing to start in a legitumate business, there is no surer investment. The profits are from 75 to 80 per cent, and the invention is a radical improvement on the odstyle of making metal sash. For further information, address Inventor, JOHN D. MORAN, 205 Hudson st., N.Y.

A Set of 12 Steel Lathe Dogs, From % to 4 inch. % 10.

PRICE ONLY 10 CENTS PER POUND.

Thomas's Fluid Tannate of Soda removes
Scale and does not injure Boiler. It proves entirely
satisfactory where all other preparations have failed.
One party writes: "Each application removed two
busnels of scales from his Boiler, and the iron looks
well where the scales have come off, and it is saving
about 15 per cent of fuel." Sold in Barrels 500 lb, half
Barrels 250 lb., quarter Barrels 125 lb. Address orders to
N. SPENCER THOMAS, Eimira, N. Y.

SUPERIOR TO ALL OTHERS. LIMET & CO'S STANDARD FRENCH FILES. Homer Foot & Co., Sole Agents,

20 Platt Street, New York.

TA full assortment of STUBS' and GROBET'S Files.



The American Turbine Water Wheel,
Recently improved and submitted to thorough scientific tests by James Emerson, showing the following usefule effect of the power of the water utilized, being the highest results evrknown.

Percentage of Part Gate: \$4,50.8; \$6,964; \$6,18,78; \$8,28,9.
Per cent. of Whole Gate: \$3,14.

A full report may be obtained of STOUT, MILLS & TEMPLE, Dayton. Ohio.

SCHENCK'S PATENT. WOODWORTH PLANERS

And Re-Sawing Machines, Wood and Iron Working Machinery, Engines, Boilers, etc. JOHN B. SCHENCK'S SONS, Matteawan, N. Y. and 118 Liberty St., New York.

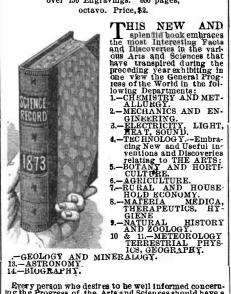
THE

SCIENCE RECORD

FOR

1873.

A Compendium of the Scientific Progress and Discove resof the Preceding Year. Illustrated with over 150 Engravings. 600 pages, octavo. Price, \$2.



Every person who desires to be well informed concerning the Progress of the Arts and Sciences should have a copy of SCIENCE RECOND FOR 1873. It is a most interesting and valuable Book, and should have a place in every Household, or every Household, in every Household, or every Household, in every Household, in every Household, in every Household, in the country, on receipt of the price. A liberal discount to the trade and to canvassers. For sale at all the principal Bookstores.

MUNN & CO., PUBLISHERS,

37 Park Row, New York City.

and one copy of SCIENCE RECORD FOR 1973, on receipt of \$4-50.

SCIENCE RECORD FOR 1872, uniform with the above, Price 23. Library binding, \$2.50.

WORKING CLASS Male or Female, \$30 week, employment at home, day or evening, no capital; instructions & valuable package of goods sent freeby mail, Address, with six cent return stamp, M. YOUNG & CO., 173 Greenwich St., N.Y.

WROUGHT IRON BEAMS & GIRDERS

THE Union Iron Mills, Pittsburgh, Pa. The Union from Mills, Fittsburgh, Fa.

The attention of Engineers and Architects is called to our improved Wrought-Ires. Beams and directs (patented). In which the compound welds between the stem and flanges, which have proved so objectionable in the old mode of manufacturing, are entirely avoid d, we are prepared to furnish all sizes at terms as favor: ble 'scan beobtained elsewhere. For descriptive litt ogra; ha i Iress Carnegie, Kloman & Co, Union Iron Mills, Pitts urg. Pa.

BLE GLASS in all forms. Chloride of Calcium. Magnesia in native form. Hydrofluoric Acid. Nickel Salts, Sulphate and Chloride. Metalis and Metallic Oxides. Felspar, Flint, and Fluorspar finely ground. Manganese, Black Oxide. All rare Chemicals and Drugs made to order by L. & J. W. FEUCHTWANGER, Chemists and Importers, 55 Cedar Street, New York. Editors of Treatise on "Gems," \$5.24 per copy; "Fermented Liquors," \$3 12 per copy; "Soluble Glass," \$1 per copy; "Nickel," 50c. per copy. All mailed free.

JOSEPH A. SPRINGER,
SOLICITOR OF PATENTS FOR THE ISLAND OF CURA.
Address U. S. CONSULATE GENERAL,
Havans.

A LCOTT LATHES, for Broom, Rake, and Hoe Handles. S. C. HILLS, 51Courtlandt St., N.Y.



REYNOLDS' Turbine Water

Wheels. 30 Years' experience enables me to excelin Gearing Mills of all kinds, and furnishing them reliable, economical power. Scientific pamphlet free. GEO. TALLCOT, % Liberty Street, New Yors.

THE HYDRAULIC ROTARY GOVERNOR secures to Water Wheels exact speed under all possible conditions, whether simple or the most complex. Under extreme variationsit operates the entire gate in ten sec-onds. Warranty unlimited. No pay till tested. JOHN S. ROGERS Treas., 19 John St. Boston, Mass

PATTERN & BRANDING LETTERS—SHARP, Flat or Rounding Surfaces-Large stock. PAVE MENT Letters, suitable for ARTIFICIAL STONE-WORK. VANUERBURGH, WELLS & CO., 18 Dutch, cor. Fulton St., New York

Pass This By tto, but if you are a fool or luna tto, but if you are sance address, EUREKA POETABLE TABLE CO., St. Louis.

\$125 A MONTH to Lady Agents everywhere Address Ellis Manuf's Co., Waltham, Mass

FOR SALE—The right to manufacture and Sell the Patent Stave Grain Baskets in the States of Ohio, Pennsylvania, and New York. Said Baskets protected by numerous patents issued to Horace C. Jones and others.

G. I. BREWSTER, Appleton, Wis.

Niagara Steam Pump, CHAS. B. HARDICK, 28 Adams st., Brooklyn, N. Y.

M ASON'S PAT'T FRICTION CLUTCHES are manufactured by Volney W. Mason & Co., Frovidence, R. L. Agents, L. B. BRCOKS, 60 Cliff street, New York; TAPLIN, RICE & CO., Akton, Ohio.

Advertisements.

RATES OF ADVERTISING.

Back Page - - - - - \$1.00 a line.
Inside Page - - - - - 75 cents a line.

Engravings may headadvertisements at the same rate per line, by measurement, as the letter-press.

The value of the Soientific American as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now pub-lished. It goes into all the States and Territories, and is read in all the princip al libraries and reading-rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his adver tisement in a printed newspaper. Hewants circulation If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth \$8.75 per line to advertise in one of forty-five thousand.

BAIRD'S

FOR PRACTICAL MEN.

My new, revised and chlarged Catalogue or Practical And Solentific Books—96 pages, Svo.—will be sent, free of postage, to any one who will favor me with his address.

HENRY CAREY BAIRD, INDUSTRIAL PUBLISHER,
406 WALNUT STREET, Philadelphia

The Practical Metal Worker's Assistant:

The above, or any of my Books, sent by mail, free of postage, at the publication prices. My new and enlarged CATALOGUE OF PRACTICAL AND SCIENTIFIC BOOKS—96 pages, 8vo.—sent free to any one who will furnish his address.

HENRY CAREY BAIRD,
INDUSTRIAL PURLISHER,
406 WALNUT STREET, Philadelphia.

E. M. MAYO'S PATENT BOLT CUTTER, Send for Illustrated Circular, Cincinnati, Ohio.



CHAMPION SPRING MATTRESS—The latest and best improvement. Do you want a healthy and comfortable bed? Here it is. The softest, easiest, cheapest, most popular, and durable Spring Bed in market. Sold by all leading dealers. No stock complete without it. Wholly composed of tenacious tempered steel springs, so united that the pressure is equally distributed. Easily moved or carried about the house. Can be lifted, turned, or rolled up like a blanket. Both sides alike. No frame.no wooden slats, no straps. May be used on floor without bedstead. No under bed required. Needs only half thickness of hair mattress. The regular size double bed, 4ft. 6 in. by 6 ft., contains \$2 steel upholstery springs and weighs only thirty lbs. More springs for your money in this bed than in any other. Warranted noiseless. Any sizes made to order send for pictorial circular. Retail price of double bed, \$18. Shipped, by single bed or quantity, to all parts of the werld. Liberal discount to the trade. Agents wanted. Champion Spring Mattress Co., Makers, 102 Chambers 8t., cor. Church, New York.



WOODWARD'S ARCHITECT 1000 WORKING DRAWINGS.

Plans, Details, Specifications & Estimates 'Twelve Dollars, post-paid.

MONCKTON'S NATIONAL Six Dollars, post STAIRBUILDER. paid, MONCK TON'S NATIONAL Six Dollars, post CARPENTER & JOINER, Framing and Roofing.

ORANGE JUDD & CO., 245 Broadway, New York.

Improved



DUNCHING

JUNCHING
AND
DROP PRESSES.

For the Best and Cheapest Address THE STILES & PARKER PRESS CO.
MIDDLETOWN, CONN.

A Rare Chance to Advertise.

Cheapest and Best Mode of Introducing NEW MACHINERY AND INVENTIONS.

To Advertisers.

About the 15th of November, we shall publish a SPECIAL edition of 60,000 copies of the SCIENTIFIC AMERICAN, which will be mailed in separate wrappers and the postage prepaid to every post office in the United States, Canada, and adjoining provinces.

It is intended that a copy of the paper shall reach the principal manufacturers, workers in lumber and and iron, railroad shops, and the works of other mechanical and chemical industries in the United States Advertisements will be taken for this extra edition on the same terms as in the regular issue, namely, 75 cents a line inside, and \$1 a line on last page. A few notices, in the Business and Personal column, not exceeding four lines in length, will be inserted at \$150 a line. This affords an unusually favorable epportunity for advertisers to reach a class of persons not accessible in the ordinary channels of advertising. The names have been selected with care, and the publishers guarantee the number issued to be full 60,000; the postage on these copies, which is twelve hundred dollars, will be prepaid, thus insuring the prompt forward ing of the papers to their destination.

Advertisers will bear in mind that this announcement is for a Special Edition which is to be circulated gratuitously among non-subscribers, and that the same advertisements which appear in the regular edition, if ordered in the extra, will be seen by entirely different persons.

ENGRAVINGS.

A few illustrations and descriptions of machines or articles of utility, whether they have already appeared this paper or in other publications, will be received for insertion in this Special Edition on reasonable terms.

MUNN & CO., Publishers,

MAN POWER SAWS. Circular, Jig, Band & Bench. See "Sci. Am.," Vol. 26, p. 366; Vol. 28, p. 79 & 306.
FOR SPEED AND WORK UNEQUALED.

Combined Power Co., 23 dey st., n.y.

A S GEAR,
Sole Owner and Manufacturer of the GEAR VARIETY
MOULDING MACHINE—Legality of Patents Sustained in United States Courts—Price \$150,
\$175, \$380, \$40, \$500—and Manufacturer
and Dealer in all kinds of

Wood and Iron Working MACHINERY

Steam Engines & Mechanical Supplies, 56 TO 62 SUDBURY ST., BOSTON, MASS.

Reasons in Support of our Claim to favorable consideration.

consideration.

1. What we manufacture we exclusively control for the whole country by patents granted to us or purchased by us.

2. Instead of attempting to evade others' rights by manufacturing to get around good machines, we select and purchase them from legal owners.

3. We sell at the market price, and as low as producers, being satisfied with very small profits on large sales.

3. We sell at the market price, and as low as producers, being satisfied with very small profits on large sales.

4. We ship machinery from the factories where it is made, so that the ireights are the same as if purchased of the manufacturers.

5. We guarantee to furnish THE LATEST IMPROVED machinery known, and that which is best suited to the work to be performed.

6. We sell original and legal productions oaly, thus preventing trouble with owners of patents for infringements and costly litigations; and we also warrant every machine to be as represented.

7. We give special attention to fitting out shops complete, and by a consolidation of profits and saving of expense incident to selecting, are enabled to furnish all that the various manufacturers produce at as low, if not lower rates than they can be purchased of others.

8. An experience, extending over a period of twenty years, in the examination of all new contrivances as soon as known, and learning from users what they consider the best products, warrants us in saying that we can save purchasers a great deal of trouble and money by giving us their patronage.

9. Our interest being also the purchaser's interest, we cannot afford to displease or misrepresent, therefore we make all our transactions of mutual benefit to THE GOOD BUILDER, THE PURCHASER and OURSLIF.

10. We fill orders as designated by purchasers, or, when it is desired, select and send the best known—support the good and denounce the bad—and by keeping thoroughly posted, often furnish a good tool or machine but little known at a cost much less than the stiff price demanded for ot hers which are no better.

11. Our unprecedented success warrants us in keeping ordered ahead alarge supply of good machinery, besides keeping at our warerooms a larger stock than can be found anywhere else in the United States. We also feel safe in saying that we can ship and deliver machinery as soon, if not sooner, than others.

12. Send for Catalogue and Circulars, and ask any questions regarding any mechanical p

In deutsche Erfinder.

Diefe große und thatige Claffe unfrer Bevölkerung machen wir besonders darauf anfmerkfam, daß unfre Firma durch ihre Berbindung mit Bashington und den europäischen Bauptstädten, besondere Borthoile gur Erlangung bon in- und ausländischen Batenten

Jeder Erfinder, gleichviel welcher Nationalität angehörig, ist durch die liberalen Patentgesetze ber Bereinigten Staaten jum Patentichut für Erfindungen berechtigt. Unfre Firma ift bereit, gestiitt auf 26 jahrige Erfahrung, beutiche Erfinder jeder Beit zu berathen und zu mäßigen Preisen raid und piinktlich Patente zu erlangen.

Die Deutsche Section ift in ben Banben fähiger beutscher Ingenieure, welche in ber Office personlich mit Erfindern verkehren merben.

Der "Scientific American" wird in feinen Spalten die bedeutenderen Erfindungen befprechen.

Correspondeng erbeten und prompt beantwortet. Pamphlete in beutscher Sprache merden auf Berlangen franco zugesandt.

Abreffire:

Minnn & Co., Scientific American" Patent Agentur, 87 Part Row, New York City 55 to \$20 perday! Agents wanted! Allclasses of working peo-work for usin their spare moments or all the time than at snything loss Farticulars fras. Address & Skinson & Co., Fortland Meine.

SHINGLE AND BARREL MACHINERY.— Improved Law's Patent Stingle and Reading Machine, simplest and best in use. Also, Shirgie Reading and Stave Jointers, Stave Equalizers, Heading Planers Thinots, &c. Address TREVOR & Co. Lockport, N. Y.

OWELL PATENT DOOR AND GATE SPRING, worth ten of all others. Won't corrode or break. Ask the Hardware dealers for it, or adaress sole Manufacturer, JAS. H. WHITE, Newark N. J. Territory for Sale.

STILL OIL DIES For cutting business stencils, alistzes. Also stencils and Key Checks, with which young men are making from \$5 to \$2J a day. Send for catalogue and samples to S.M.SPENCER, 117 Hanover St., Boston, Mass. NEW & IMPROVED PATTERNS MA CHINISTS' TOOLS—all sizes—at low prices. E. GOULD. 97 to 113N. J R. R. Ave., Newark, N. J

OTIS' Machinery. NO. 348 BROADWAY NEW YORK.

OOD-WORKING MACHINERY GENerally. Specialities, Woodworth Planers and Richardson's Patent Improved Tenon Machines. Central, corner Union st., Worcester, Mass. WITHERBY RUGG & RICHARDSON.

AGENTS, S.3 (). LLOYD'S new thirty dollar double maps for 1873 and 1874, are ready, and are to be given away gratis. Size of each map, 62x64 inches, mounted on English cloth, exhibiting 10.30,000 names of cities, towns, villages, rivers, lakes, mountains, and streams. Both these great maps are to be given gratis to every housekeeper in America. These maps are the greatest ever made by LLOYD, who made all the maps used by GENERAL GRANT during the war. Male and Female Agents wanted in every county, to whom we allow one dollar for every map distributed. Address with stamp for answer, BOSTON ADVERTISER CO., 29 Court Street, Boston, Mass.



LASS: MOULDS for Fruit Jars, Patent Jars, Patent Jars, Patent Jars, Patent Botfles, etc., made by H. BROOKE, to years at White and Centre Streets, New York, The shortest and chaspest way order direct of Mould Maker.

The Particular ATIENTION pull to MOULDS for INVENTORS.



U. S. Plano Co., 810 Broadway, N. Y.

LICHARDSON, MERIAM & CO.

Manufacturers of the latest improved Patent Danels' and Woodworth Planing Machines, Matching, Sash and meding, Tenoning, Mortising, Bering, Shaping, Verical, and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip-saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working Machinery. Catalogues and pricelists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st. New York. 17

PAGE'S Water Flame Coal Lime Kiln, with with use of water. C.D. PAGE, Patentee. Rochester, N.Y.

.D ROLL

In use, renders it undoubtedly the most schooling to the are also the sole manufacturers of the Children are also the sole manufacturers of the Children are decided in the most approved style of the most approved style of the most approved to the most approved

MACHINERY, NEW and 2d-HAND.--Send for Circular. CHAS. PLACE & CO. 60 Vesey st., New York.

Steel Stam ps Clothing Stamps. 90c. each.
Agents wanted. PITNER & CO., Wilmington, Del.

PORTABLE STEAM ENGINES, COMBIN ing the maximum of efficiency, darability and econ-my, with the minimum of weight and price. They are widely and fayorably known, more than 1,000 being in use. All warranted satisfactory or no sale. Descriptive directions and on another time. Address. circulars sent on application. Address
THE J. C. HOADLEY CO. Lawrence, Mass.
Liberty st., New York.

ENGINES, BOILERS PUMPS, &c.

Bought, sold and exchanged. All sizes and kinds constantly on hand. Address, for circular, E. E. ROBERTS, 52 Broadway, New York.

Andrew's Patents.

Anuvew's Pattents.

Noiseless, Friction Grooved, or Geared Hoise ers, suited to every want.

Safety Store Elevators, Prevent Accident, Rope, Belt, and Engine break.

Smoke-Burning Safety Boilers.

Oscillating Engines, Double and Single, 1-2

100-Horse power.

Centringal Pumps, 100 to 100,000 Gallons per Minute, Best Pumps in the World, pass, Mud, Sand, Gravel, Coal, Grain, etc., with out injury.

All Light, Simple, Durable, and Economical.

Send for Circulars.

WM. D. ANDREWS & BRO.

414 Water Street, New York.

\$425. Upright Engine and Tubular Boiler (4) Horse Power, with all Trimmings; also (10) Horse Power. Send for Circulars.

VARIETY IRON WORKS Co., Cleveland, O.

WHALEN TURBINE. No risks to purchaser. Pamphletsentfree. SETH WHALEN. Ballston Sps., N. Y.

MILLING MACHINES.
Universal and Plain—Gear and Cam Cutting, &c. al and Plain—Gear and Cam Cathing, Soc. Send for descriptive catalogue to BRAINARD MILLING MACH. CO. 115 Water St. Boston

\$425 A MONTH! Horse and carriage furnished Expenses paid. H. B. SHAW, Alfred, Me

THE HORTON LATHE CHUCK, from 4 to 36 inches, with the new Patent Jaw. Address THE E. 110 PTON & SON CO.. Windsor Locks, Ct

DUERK'S WATCHMAN'S TIME DE-and Manufacturing cencerns—capacie of controlline with the utmost accuracy the TECTOR.—Important for all large Corporations and Manufacturing concerns—capsale of controlling with the utmost accuracy the motion of a watchman or patrolinan, as the same reaches different stations of his best. Send for a Circular.

P. O. Box 1,077 Boston, Mrss.

N. B.—This detector is covered by two U. S. Patents, Parties using or selling these instruments without authority from me will be dealt with according to law.

Machinery,
Wood and Iron Working of every kind. Leather and
Rubber Belting, Emery Whoels, Babbitt Metal, &c.
GEO. PLAGE & CO., 121 Chambers St. N.Y.

Cold Rolled Shafting.

Best and most perfect Shafting ever made, constantly on hand in large quantities, furnished in any lengths uto 24 ft. Also, Pat. Coupling and Self-oiling adjustable Hangers.

GEORGE PLACE & CO.,

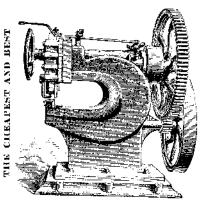
121 Chambers Street, New York.

Sturtevant Blowers.

Of every size and description, constantly on and.

GEORGE PLACE & CO.,

121 Chambers Street, New York.



SEND FOR PHOTOGRAPH AND PRICE.

MOSES G. WILDER,

121 CHAMBEES ST., N. Y.

Farrel's Patent Railway Crane, Patent Ground Chilled Rolls,
ROLLING MILLS AND MILL MACHINERY,
Punches and Shears for heavy work—Fly Wheels, Shafts,
Gears, Pinlivs, and Special Castings, at Low Prices,
FARREL, FOUNDRY & MACHINE CO.,
MOSES G. WILDER, SELLING AGFNT,
121 Chambers Street, New York

THE "PHILADELPHIA" $HYDRAULIC\ JACK.$

DISTON guided from both ends; all working parts guarded from dust; single or double pumps, cylinders, shafts, rocker arms, pistons, etc., entirely steel. No. 14 N. 5th st., Philadelphia. PHILLIPS. JUSTICE.

SCIENTIFIC AN AMERICAN

The SCIENTIFIC AMERICAN is devoted to the intersts of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture, Commerce, and the industrial pursuits generally, and is valuable and instruc-tive not only in the Workshop and Manufactory, but also in the Household, the Library, and the Reading Room.

The Best Mechanical Paper in the World A year's numbers contain over 800 pages and several hundred engravings of new machines, useful and novel inventions, manufacturing establishments, tools, and

To the Mechanic and Manufacturer! No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERI-CAN. Every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication.

One copy, one year One copy, six months

1.00

One copy of Scientific American for one year, and one copy of engraving, "Men of Progress"

One copy of Scientific American for one year, and 10.00 one copy of "Science Record," for 1873

Remit by postal order, draft or express. The postage on the Scientific American is five centager quarter, payable at the office where received. Canada subscribers must remit, with subscription, 25 cents extra

to pay postage. Address all letters andmakeail Post Office orders and drafts payable to

MUNN & CO., 87 PARK ROW NEW YORK.

Adrertisements

Advertisements will be admitted on this page at the rate of \$1.00 per line for each insertion. Engravings may head advertisements at the same rate per line by meas urement, as the letter-press.

PRATT'S ASTRAL Safest and best Oil ever made-burns in any lamp-for sale everywhere.



JUST PUBLISHED!

"Facts and Suggestions regarding the Right Choice and Right Use of Solid Emery Wheels and Emery Grinding Machinery." 124 pages.

This Pamphlet is offered to the Public as the most complete Manual on the subject of Emery Grinding yet published. Sent, post-paid, on receipt of 25 cents.

Address THE TANITE CO., Stroudsburg, Pa.

HOW ABOUT YOUR PAY ROLL?

HOW ABOUT YOUR PAY ROLL!

Is not THIS the time—now when working forces are being reduced, and each man's effort is to see how FEW hands he can get along with—is not this the time to study carefully the claims of labor-woring tools? How much Wages will a good Emery Grinding Machine draw? How many men now working with File, and Grindstone, and Cold Chisel, and Vise, can be dispensed with by running a Rotary file a mile a minute? How many Pay Roll Swelling men will take to do. with Vise and File, what one man will do with that never-dulling Rotary File, a Tanite Emery Wheel? That File whose nothers are crystals of Adamant, and whose speed is as \$5,500 feet to 60 feet.
When money is scarce, Labor Saving Tools are cheap!

is as 5,500 feet to 60 feet. When money is scarce, Labor Saving Tools are cheap!



Improved Foot Lathes.

Small Engine Lathes. Small Gear
Cutters, Hand Pla-es for metal, Ball
Turning Machines, Slide Rests, Foot
Scroll Saws. Thevery best. Selling
eve. ywhere. Catalogues free.
N. H. BALDWIN, Laconia, N. H.

HORSE STALL FLOOR, Patented through the Scientific American Patent Agency, June 4, 1872. Rights sent by mail with full instructions how to make and use, together with Briss Patent Stamp, on receipt of 50 cts. each. They will keep the stall clean and the Horse much more comfortable. Requires but one third of the usual amount of bedding, and is so simple that any man can make them with but little expense.

G. W. GORDON, Chelsea, Mass.

A COMPLICATE EXPLANATION OF THE PHYSI OLOGY of the Digestive Processes, with the Symptonis and Treatment of Dyspepsia and other Disorder By R. T. TRALLAMD. By far the best and outs community work on the subject; every process of digestion s of usely illustrated, and fully explained. The cames of dyspepsia, with minate directions for the successful treatheant of disease from which the world is suffering more perhaus, than from any other Thisbook tells us '4 what to dearn's and '6 how to do it," to cure Dyspepsia '4 without medicine. For safe by bookerliers, or sent first just, on receipt a price, it, by S. R. Wellis Publisher, 329 Broadway. New York. State where you saw this adv't. We have also "The fain." Of cents; "Hygenic Hand-Book," \$2, "Hydropathic Ency clopedia," 4.50; The Science of Health, a first-class monthly, \$2 a year; 6 months on trial, it. Stamps for Illustrated Catalogue and Special List of private medical works



SELF OILERS, FOR ALL KINDS OF MACHINERY AND STEAM CHESTS OF ENGINES.

STEAM CHESTS OF ENGLASE.

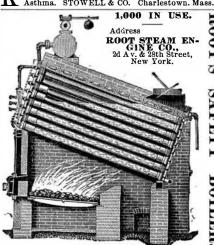
Owing to recent improvements in our works, we are enabled to sell oil Cups, equal in finish and utility, at 25 per cent less than any house in the country.

T. HOLLAND.

8 Gold Street, New York.



IDDER'S PASTILES—A Sure Relief for KIDDER'S PASTILLES—IN SUIT ASSENTATION ASS



HOUSTON'S PATENT TURBINE WATER WHEEL

Simplest, Strongest, Cheapest, Best. In the test at Holyoke, in 1872, the Houston gave the 1872. the Houston gave the highest percentage ever shown in a reliable test and the highest average results ever obtained. In practical use it is everywhere demonstrating its superiority over all others. Emerson's full report furnished on application. Send for Circular Exercisis of the control of the cont iar. MERRILL & HOUSTON IRON WORKS, Beloit, Wisconsin.

Malleable Iron & Steel Castings

CARR, CRAWLEY & DEVLIN,

OFFICE, 307 ARCH STREET, PHILADELPHIA, PA., Manufacturers also of FINE GREY IRON CASTINGS, and an assortment of BUILDING AND CABINET, CARRIAGE AND SADDLERY HARDWARE for the Trade.



Todd & Rafferty Machine Co.

MANUFACTURERS OF
The celebrated Greene Variable Cut-Off Engine; Lowe's
Patent Tubular and Flue Boilers; Plain Slide Valve Stationary, Hoisting, and Portable Engines. Boilers of all
kinds. Steam Pumps, Mill Gearing, Shafting, &c.; Silk,
Tow, Oa kum, Bagging, Rope, Flax, and Hemp Machinery,
Agents for the New Haven Manufacturing Co.'s Machinists' Tools; for Judson's Governors and Stop-Valves:
Sturtevant Blowers; and Differential Pulley-Blocks.
WAREROOMS. 10 BARCLAY ST., NEW YORK.
WORKS, PATERSON, NEW JERSEY.



LUBRICATORS. REYFUS' transparent Self-acting Oliers, for all sorts of Machinery and Shafting, are reliable in all seasons, saving 75-95 per cent. The SELF-ACTING LUBRICATOR for Cylinders is now adopted by over 130 R. R. in the U.S., and by hundreds of stationary engines. NATHAN & DREYFUS, 108 Libertyst., N.Y.

Working Models

And Experimental Machinery, Metal, or Wood, made to order by J. F. WERNER, 62 Center st., N. Y.

SUPER-HEATERS Save fuel, and supply DRY steam. Easily attached to any boiler. HENRY W. BULK LEY, Engineer. 98 Liberty St., New York.

Pyrometers. For testing Ovens. Boiler flues, Blast furnaces. Super-Heated Steam, Oil Stills, &c.

HENRY W. BULKLEY,
98 Liberty St., New York

500,000 PIRON MELTED IN 8 HOURS. MAR 9 14 1870.

MESS THWAITS & CARBUTT) MAKERS ROOTS BLOWER ENGLAND

ABBREVIATED LETTER.

"I USED TWO Nº 5 ROOTS BLOWER WHEN CASTING THE 250 TON ANVIL BLOCK MELTING 30 TONS IRON PER HOUR.

I SHALL IN FUTURE EXCLUSIVELY RECOMMEND THIS BLOWER! PH.& F.M.ROOTS CONNERSVILLE IND. W. IRELAND

S.S.TOWNSEND GENL AGT 31 LIBERTY ST.N.Y. PATENTEE IRELANDS CUPOLA

A GENTS WANTED—Anybody can make it pay. First class articles for Office and House hold use. Manufacturer's prices, and enormous profits Address, for circular, JAS. H. WHITE. Newark, N. J.

New Invention. ADDRESS, HOWARD IRON WORKS, BUFFALO.N.Y.

WIRE ROPE.

JOHN A. ROE BLING'S SONS

MANUFACTURERS, TRENTON, N. J.

FOR Inclined Planes, Standing Ship Rigging
Bridges, Ferries, Stays, or Guys on Derricks & Cranes,
Tiller Ropes, Sash Cords of Copper and Iron, Lightning
Conductors of Copper. Special attention given to hotaling rope of all kinds for Mines and Elevators Apply for
Ortular, giving price and other information Send for
Daniphlet on Transmission of Power by Wire Ropes. A
large stock constantly on hand at New York Warehouse
No. 117 Liberty street.

WIRE ROPE. John W. Mason & Co., 43 Broadway, New Yor

TRON PLANERS, ENGINE LATHES Drills, and other Machinists' Tools, of superior qual try, on hand, and fin ishing. For sale low. For Descrip-tion and Price address NEW HAVEN MANUFACTUR-ING CO. New Haven. Conn.

Machinist's Tools,EXTRAHEAVY AND IMPROVED.

LUCIUS W. POND, MANUFACTURER

Worcester, Mass. Warerooms, 98 Liberty Street, New York. A. C. STEBMNS, Agent.

No. 1 Ferry St., New York. Movable-Toothed Circular Saws PERFORATED CROSS-CUT,

SOLID SAWS.

IVENS & BROOKES PATENT Eccentric-Geared Power Press.

RANSOM SYPHON CONDENSER perfects AMBUM SYPHUN CONDENSER perfects and maintains vacuum on Steam Engines at cost of one oer cent its value, and by its use Vacuum Pans are run with ruil vacuum without Air Pumo. Please call at the Company's office, Buffslo, N. Y. Circulars sent to any address.

STATIONARY AND PORTARLE STEAM ENGINES.

Babcock & Wilcox Patent Safety Boilers, LEFFEL'S DOUBLE TURBINE WATER WHEEL, SHAFTING, PULLEYS, HANGERS AND GEARING,

POOLE & HUNT, BALTIMORE.

Soluble Glass,

Manufactured by
L. & J. W. FEUCHTWANGER, New York

PAT. WATER-PROOF BUILDING PAPER. Parties using this Paper once will use no other. COFFIN & LYON, Paper and Twine Warehouse, No. 23 Beekman Street, New York, Sole Agents. Samples and Catalogues sent free. TAR USED

IRON STEAMSHIP BUILDERS. NEAFIE & LEVY,

PENN WORKS,
MARINE ENGINES, BOILERS, AND BUILDERS OF COMPOUND ENGINES,
PHILADELPHIA PA.

STEAM BOILER AND PIPE

Saves ten to twenty per cent. CHALMERS SPENCE CO., foot E. 9th St., N. Y.; 1202 N. 2nd St., St. Louis, Mo.

A specimen copy of the AMERICAN BUILDER mailed to ou free by sending address to CHARLES D. LAKEY, Publisher, 23 Murray Street, New York.

VERY VARIETY EAM PUMPS. SEND FOR ILLUSTRATED CATALOGUE COPE & MAXWELL MFG.CO. HAMILTON, OHIO.

NOYE'S MILL FURNISHING WORKS are the largest in the United States. They make Burr Millstones, Porta ble Mills, S. mut Machines, Packers, Mill Picks, Water Wheels, Pulleys and Gearing, specially adapted to flour Wheels, Pulleys and Gearing, specially dispected to flour Wheels, Pulleys and Gearing, Section 11, NOYE & SON, Buffalo, N. Y.

KEEP YOUR BOILERS CLEAN.

prevents and removes scale in Steam Boilers—does not injure the Iron. In use over five years. Patented.

J. J. ALLEN'S SONS, Philadelphia, Pa.

LEFFEL'S IMPROVED DOUBLE TURBINE



JAMES LEFFEL & CO., SPRINGFIELD, Onio. or109 LIBERTY ST., N. Y. CITY.

DOGERS' TANNATE OF SODA, against Note that the control of the control

MAGIC LANTERNS AND STEREOPTICONS, for Public Exhibitions, Out-door Advertisements, etc., etc. A good paying investment for a man with small capital. Catalogues free.

McALLISTER, Optician, 49 Nassau St., New York.

How Pig Iron can be Made FOR FIVE DOLLARS A TUN, CLEAR OF SULPHUR.

EMERY WHEEL MACHINERY



EMERY WHEEL MACHINER, for grinding Tools and Metals, gumming Saws, cleaning Castings, grinding Planer Knives perfectly straight—unequaled for thesterling quality of its material and workmanning, the durability of every part. Address AMERICAN TWIST DRILL COM-R. I.

D. C. FLINT, Bardolph. Ills.

PORTLAND CEMENT

From the best London Manufacturers. For sale by
JAMES BRAND, 55 Cliff St., N. Y.
A Practical Treatise on Cement furnished for 25 cents

T. V. Carpenter, Advertising Agent. Address Box 773, New York city.



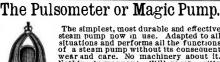
THREE PLY ROOFING,
In Use Ten Years.
A good article, well recommended, and suitable for either steep or flat roofs. Send for Circular and Sam ples. MICA ROOFING Co., 73 Maiden Lane, New York. THE

- J LATEST IMPROVEMENT LUBRICATORS This NEEDLE-VALVE OIL FEEDER for Locomotive and Stationary Engines has met with great success. Master Mechanics will be furnished with Sample Cups by addressing

BLAISDELL & CO.,

Patent Drill Presses, with Quick Return Motion, In the Market, also other Machinist Tools.

BUILDERS SEND FOR BOOK CATALOGUE BICKNELL, 27 Warren st., N. Y

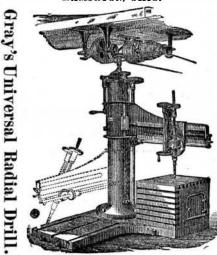


The simplest, most durable and effective steam pump now in use. Adapted to all situations and performs all the functions of a steam pump without its consequent wear and care. No machinery about it. Nothing to wearout, Will pump gritty or muddy water without wear or injury to its parts. It cannot get out of order.

C. HENRY HALL & CO., 20 Cortlandt Street, New York City.

NILESTOOLWORKS,

HAMILTON, OHIO.



ROSEWOOD, WALNUT, WHITE HOLLY SATIN WOOD HUNGARIAN ASH, AND ALL KINDS OF WOODS,

IN LOGS, PLANK, BOARDS, AND VENEERS, GEO. W. READ & CO.,
Milland Yard, 186 to 200 Lewis St., cor, 5th St., E. R., N. Y

FOR other by mail promptly and faithfully executed.

EM Enclose Sc. stamp for Catalogue and Price List.

Veneer Cutting Machines

FOR SALE,
ONE ROTARY MACHINE, cutting 4 ft. long
and 4 ft. diameter.
ONE SLICING MACHINE, cutting 5 ft. 6 in.
Both in perfect order, with pulleys, shafting, etc. Complete for immed at cuse. Frice low.
Address

186 to 200 Lewis Street, E.R., New York.

THE HEALD & SISCO

Patent Centrifugal Pumps,

VERTICAL & HORIZONTAL.

First Premiums at New Orleans, Cinclinati, and New
York. "Medal of Special Award," American
Institute, 1872.

Perfect satisfaction guaranteed. The cheapest, most
durable, popular and successful Pump known, for Paper
Makers, Tanners, Contractors, Brick Makers, Distillers,
etc. Pumps with engine on frame. complete, at low
igures, for Wrecking, Dredging, Irrigating, etc. Illustrated pamphlet, free. 600 references to parties actually using
the Pump. 22 pages of the strongest possible testimony.
Address HEALD, SISCO & CO., Baldwinsville, N.Y.

N. Y. Safety Steam Power Co., 30 CORTLANDT STREET NEW YORK



Superior STEAM ENGINES AND BOILFRE, by special machinery and duplication of parts. They are Safe, Economical, Easily Managed and not liable to derangement. Their Combine
ENGINE AND BOILER is peculiarly
adapted to all purposes requiring
small power. More than 400 engines,
from 2 to 100 horse power, in use.
Send for illustrated circular.

Send for fitustrated circular.

3875 to \$250 per month, everywhere male, to introduce the GENUINE IMPROVED COMMON SENSE FAMILY SEWING MACHINE. This Machine will stitch, hen, fell, tack, quilt, cord, bind, abraid and embroider in a most superior manner. Price only \$15. Fully licensed and warranted for five years. We will pay \$1,000 for any machine that will sew a stronger, more beautiful, or more elastic seam than sours. It makes the "Elastic Lock Stitch." Every second stitch can be cut, and still the cloth cannot be pulled apart without tearing it. We pay Agents from of \$75 to \$250 per month and expenses, or a commission befrom which twice that amount can be made. Address SECOMB & CO. Boston, Mass.; Pittsburgh, Pa.; Chicago, Ill.; or St. Louis Mo.

TRY THE VICTOR DRILL CHUCK.—
Warranted to hold with a clasp of the hand. Triumphant at Vienna. HUBBARD & CURTISS MANUFACTURING CO., Address Middletown, Conn.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO. 'S INK. Tenta and combard etc., Philadelphia and 59 Gold st., New York