Business and Personal.

The charge for Insertion under this head is (me Dollar a line tisements must be received at publication office as early as Thursday morning to appear in the following week's issue

Acme engine, 1 to 5 H. P. See adv. next issue. "U. S." metal polish. Indianapolis. Samples free. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. 6 Spindle Turret Drill Presses. A.D. Quint, Hartford, Ct. Patent Open-Side Planing and Shaping Machines Pedrick & Ayer, Philadelphia, Pa.

Wm. Jessop & Sons, the celebrated steel makers, observe the centennial of their firm next year.

Glass grinding and polishing machinery wanted. Apply Tacony Iron and Metal Co., Tacony, Pa.

Tools for sheet metal goods, presses, lathes, dies, etc Empire Machine and Tool Co., New Brunswick, N. J. Steam Hammers, Improved Hydraulic Jacks, and Tube

Expanders. R. Dudgeon, 24 Columbia St., New York.

Stow flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y. See adv., page 254. Screwmachines, milling machines, and drill presses The Garvin Mach. Co., Laight and Canal Sts., New York. Centrifugal Pumps for paper and pulp mills. Irrigating

and sand pumping plants. Irvin Van Wie, Syracuse, N. Y. Portable engines and boilers. Yacht engines and Payne & Sons, Elmira, N. Y., and 41 Dey Street, New York.

To Let-A suite of desirable offices, adjacent to the Apply to Munn & Co., 361 Broadway, New York.

Wanted Tool dresser. Young, energetic man can obtain good position by addressing Master Mechanic, Swift & Company, Union Stock Yards, Chicago, Ill.

Fine castings in brass, bronze, composition (gun metal), German silver. Unequaled facilities Jas. J. McKenna & Bro., 424 and 426 East 23d St., New York.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, N. Y.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Canning machinery outfits complete, oil burners for soldering, air pumps, can wipers, can testers, labeling machines. Presses and dies. Burt Mfg. Co., Rochester. Competent persons who desire agencies for a ne

popular book, of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway. New York. Free on application



HINTS TO CORRESPONDENTS.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavorto reply to all either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remaneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Winerals sent for examination should be distinctly marked or labeled. (4583) R. S. T. asks: What force causes

the earth to revolve on its axis? If not known, what is the theory? A. According to the nebular hypothesis. the planets were formed from rings of nebulous matter separated successively from the main body, which, having a greater velocity at the outer edge than the inner edge, the gradual concentration of the ring by breaking and drawing to a common center increased the velocity of the outer side, by drawing it toward the central mass. This would induce a tendency to revolve, increasing by its contraction toward the central axis of the future planet. Thus when started into a revolving mass its velocity of revolution would be gradually increased by concentration until the final velocity of the fixed form is attained.

(4584) W. T. J. writes: I desire a fire extinguisher that is not injurious to life or can be inhaled. It has been my idea that where fire is extinguished by the use of gas or a compound it is done by the absorption or exclusion of the oxygen, which would ordinary chemical fire extinguishers are supposed to owe a part of their efficacy to the generation of carbon dioxide gas, which will not support fire or life. We see no way of producing a gas which will extinguish fire yet not prove fatal to life.

(4585) E. A. O. asks: What is the chief objection to the electric trolley wires, about which so much complaint is made in certain quarters? It seems to me the electric car is a wonderful advantage to the public. A. There is no doubt the electric car is a great improvement and highly advantageous wherever introduced. The chief objection is that the trolley wire is a naked wire, along which a streak of lightning is constantly passing. If the wire falls or other wires fall upon it, serious results may follow, and in some cases have followed. There are undoubtedly real dangers attending the trolley system, just as there are in the use of steamboats, locomotives, horse cars, gunpowder, gas pipes, kerosene lamps, etc. But when proper precautions are observed all these devices are reasonably safe. The trolley dangers are to a great extent supposititious.

(4586) F. A. B. says: Please explain in your paper the proper place for a ventilator in a sleeping room to carry off the exhalations, whether near the

ceiling or near the floor, and why. A. The ventilator should be near the floor, to take away the exhalation from the lungs, which is largely loaded with carbonic acid gas and moisture, which is heavier than pure air and falls to the floor. Slightly dropping the upper eash of the window is the best way to receive fresh air from the outside, but great care should be taken not to overdo it, and make a draught that will give colds.

(4587) Subscriber says: Please inform me if the gear 1900 is a leap year. If it is not, please explain to me why? Also about the year 2000. A. By act of the British Parliament in 1752 for a reformation of the calendar, every centurial year not evenly divisible by 400 was not to be a leap year. This was to eliminate a small discrepancy arising from the division by 4 for ordinary leap years. The year 1900 will not be a leap year; 2000 will be a leap year.

NEW BOOKS AND PUBLICATIONS.

QUESTION AND ANSWERS ABOUT ELEC-TRICITY. A first book for beginners. Edited by E. T. Bubier, 2d. D. Van Nostrand Co. 1892. Pp. 100. Price 50 cents.

To produce some seventy-nine pages of actual text as contained in this volume, four separate authors and one editor were required, according to the title page. The quotation "In the multitude of counselors there is wisdom" it is to be hoped applies to this somewhat diminutive result of the combined effort of so large a

Messrs. Montgomery & Co., of New York City, have recently issued a 700 page catalogue and price list of supplies, tools, and machinery for all branches of the mechanical trades. Most of the descriptions are in very concise form, and the book is crowded with illustrations which well set out the leading features of the immense variety of implements shown. A mechanic having but a limited stock of tools to work with will find in this book almost everything needed or desirable to supplement or enlarge his fa-

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & Co., office Scientific American, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 1, 1892,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.] Adding machine, Oakes & Jackson...... 485,219

	485,589
dispensing, J. P. Jackson	485,386
Adjustable bracket, Ravenel, Jr., & Miles. Adjustable bracket, Ravenel, Jr., & Miles. Aerated water, machine for manufacturing and dispensing, J. P. Jackson. Air brake hose, coupler head for, S. M. Be ery. Air brake bose, coupler head for, S. M. Be ery. Air brake bose, coupler head for, S. M. Be ery. Air brake pipe coupling, C. D. Fabrney. Alarm box, district, C. W. McClellan. Alloy, H. G. Viveill. Alloys, chemical reagent for use in the manufacture of, S. E. Cheeseman. Alumina and acetic acid, obtaining, F. P. Dewey. Amalgam for dentists' use, G. Juterbock. Animal trap, M. D. Slawson. Armature core for electric motors and dynamos, A. J. Lehman. Atomizer, C. L. Morehouse. Axle box, car, E. Peckham. Axle for forward wheel of wagons, crank, M. L. De Witt. Bale tie, C. B. Brainard. Band fastener, H. M. Tileston. Band tighteuer, D. J. C. Arnold. Barrel cover, G. E. & G. F. Raymond, Jr. Battery. See Galvanic battery. Bearing for shafting, thrust, C. D. Mosher. Bed, folding, Herrinton & Smith Bedstead, folding, O. Alexander Bedstead, folding, M. Alexander Bedstead, folding, M. Alexander Bedstead, folding, M. Alexander Bell, electric, J. R. Hard Bell, signal, E. Olsen. Belt, O. B. Peck. Belf stretcher, E. Page Bicycle, Kenney & Cable. Bicycle supporting and locking attachment, W. Lewis. Bin. See Flour bin.	485,571 485,365
Air brake pipe coupling, C. D. Fahrney	485,182
Alloy, H. G. O'Neill	485.423
Alloys, chemical reagent for use in the manufac-	485.453
Alumina and acetic acid, obtaining, F. P. Dewey.	485,461
Animal trap, M. D. Slawson	485,3 0 3
Armature core for electric motors and dynamos,	485.284
Atomizer, C. L. Morehouse	485,396
Axle for forward wheel of wagons, crank, M. L.	405,400
Bale tie, C. B. Brainard	485,492
Band fastener, H. M. Tileston	485,482
Barrel cover, G. E. & G. E. Raymond, Jr	485,227
Bearing for shafting, thrust, C. D. Mosher	485,207
Bed, folding, Herrinton & Smith	485,276 485,159
Bedstead, folding, T. La Purl	485,502
therefor, impregnating, •. Zwietusch	485,362
Bell, electric, J. R. Hard	485,379 485,297
Belt, O. B. Peck	485,476
Bicycle, F. M. & J. E. Goodhue	485,187
Bicycle, Kenney & Cable Bicycle saddle, C. Stein	485,434
Bicycle supporting and locking attachment W	485,572
Lewis	485,285
Blank form for warranty deeds, tax receipts, etc.,	
Block. See Building block. Tackle block.	485,561
Bicycle supporting and locking attachment, W. Bicycle supporting and locking attachment, W. Lewis. Bin. See Flour bin. Blank form for warranty deeds, tax receipts, etc., Pendleton & Wilson. Block. See Building block. Tackie block. Boiler. See Multitubular boiler. Steam boiler. Boilers. feed water heater for steam. C. C.	
Worthington	485,570
Bolt, G. Drouet. Book supports, ball and socket joint for, W. H. Morrison	485,373
Morrison	485,471
Boot stretcher, J. Lyons.	
	485,331
Morrison Boot or shoe, ventilated, Turner & Engle Boot stretcher, J. Lyons Boring non circular holes, machine for, W. J.	485,243 485,331
Boring non circular holes, machine for, W. J. Smith Bottle stopper, automatic, R. G. Williams.	
Boring non circular holes, machine for, W. J. Smith Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore.	
Boring non circular holes, machine for, W. J. Smith Southe stopper, automatic, R. G. Williams. Bottle stopper fastener, F. Y. Clark Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett	
Boring non circular holes, machine for, W. J. Smith Southe stopper, automatic, R. G. Williams. Bottle stopper fastener, F. Y. Clark Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett Box nailer, J. A. Calu. Brace. See Extensible brace.	
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett Box nasiler, J. A. Caiu. Brace. See Extensible brace. Bracket, H. J. © Wel	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark. Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett. Box nailer, J. A. Calu. Brace. See Extensible brace. Bracket, H. J. Nell. Brake. See Car brake. Car ratchet brake.	485,233 485,443 485,173 485,395 485,524 485,530 485,215
Bottle stopper, automatic, R. G. Williams. Bottle stopper fa stener, F. Y. Clark Bottles, anti-filling valve for, P. B. Moore. Box. See Alarm box. Axle box. Journal box. Box fastener, S. S. Barrett Box nasiler, J. A. Caiu. Brace. See Extensible brace. Bracket, H. J. © Wel	485,233 485,443 485,173 485,395 485,524 485,530 485,215

	Car coupling, J. Mason	485,468	Lace faste
	Car coupling, G. C. McMichael Car coupling, C. W. Patton Car coupling, J. W. Poston	485,211 485,218 485,333	Lamp, elec Lamp, elec Lamp, elec
	Car coupling, P. M. Reagan	485,356 485,232	Lamp, electronic Lamp, inc.
	Car coupling, B. F. Stone	485,512 485,249 485,588	Cartwr Lathe dog
	Car heating, W. W. Munsell	485,209 485,562	Lawn sprin Lighting, i Liquid reg
	Car ratchet brake, P. M. Kling	485,548 485,598 485,553	Liquid reg Liquors or ratus f
	Car starter and brake, W. Prinzlau Cars, automatic latch for dump, I. Barker	485,353 485,403	ing Lobster sh
	Cars, gearing for propelling, W. W. Dunlap Carbureting air or gas, apparatus for, Frost & Squire	485,179 485,185	Locomotiv
п	of the wine	405 000	Loom let- Loom wef Lubricator
	H. S. Maxim. Carburetor, D. Best. Carpet stretcher, H. G. Cady.	485,526 485,406	Mait dryin Rathm
	Cart, road, C. H. Kallbreier	485,413	Measure a Measuring Met al wor
	Carburetor, D. Best. Carpet stretcher, H. G. Cady. Carrier. See Pen or pencil carrier. Cart, road, C. H. Kallbreier. Case. See Cheese case. Pencil case. Cash register and indicator, R. P. Thompson. Cash register and indicator, H. G. & C. F. Walter. Chair. See Dental chair. Nursery chair. Re-	485.240 485,307	Metals, me
	Chair. See Dental chair. Nursery chair. Re- clining chair. Chair, J. W. Hamilton	485,325	Metals, me ing, W. Meter. Se
	Chair, combined easy, rocking, and invalid, H. W. Stern. Chair for theatrical or other purposes, R. M.	485,435	Moulding, Mosquito
	Chair for theatrical or other purposes, R. M. Hunter	485,277 485,359	Motion, a Russm Motor. Se
	Hunter. Cheese case, H. D. Streator. Chimney or flue ling, E. Rathbun. Chocolate to cream drops, machine for applying, D. M. Holmes.	485,479	Sewing Motor, J. C Multitubu
	D. M. Holmes. Chuck, D. A. Barnes. Cligar cutter F. H. Smith	485,326 485,364 485,234	Multitubu Music leaf Musical in
	Chuck, D. A. Barnes. Cigar cutter, F. H. Smith. Circuit switch, Sullivan & Doss. Clay, etc., machine for moulding marbles, etc., Clay, M. M. Burget, cleanor.	485,337	Necktie. J Nursery c
	from, M. Lang. Cleaner. See Track cleaner. Clothes drier, L. A. Powers. Clothes pin, J. H. Hamilton. Clothing, envelopment for, A. G. Speed. Gn tray, J. A. Read. Compound engine, R. C. Smith. Concrete mixing machine, E. L. Ransome Copybooks, device for moistening the leaves of press, O. K. Truitt. Corn husking machine, M. & B. Colton. Cotton opening and cleaning machine, W. P. Groom.	485,282	Nut, axle, Nut lock, Oil spravit Ore feeder
	Clothes pin, J. H. Hamilton	485,274 485,509	ore separa
	Compound engine machine E. L. Ransome	485,228 485,568 485,428	Oven, rota Oxidizing Packing, l
	Copybooks, device for moistening the leaves of press, O. K. Truitt	485,592	Pad. See
	Corn husking machine, M. & B. Colton	485,531	Paper cut Paper cut Paper mal
	Groom. Countershining machine, C. Brada. Coupling. See Air brake pipe coupling. Car coupling. Thill coupling. Crank arm and shaft, A. P. Morrow	485,485	Parchmen Frist
l	Crank arm and shaft, A. P. Morrow	485,350	Pen and p Pen or per Pen, rulin
	Crimping machine, J. C. Lockett	485,204 485,231	Pencil cas Piano or o Picket and
l	Cultivator, S. S. Gerrish. Cultivator attachment, Z. A. Beecher.	485,165 485,165	Picket and sell
	Crate, E. A. Jeanes. Crimping machine, J. C. Lockett. Crupper stuffing machine, B. A. Schuler Cultivator, S. S. Gerrish. Cultivator attachment, Z. A. Beecher. Cultivator boe, hand, G. S. Dennis. Curtain fixture, M. D. Gaines. Cut-off and flue tightener, G. Wiedeke. Cutter. See Cigar cutter. Potato cutter. Sod	485,270 485,442	sell Pile of wo W. D. Pin. See
l	Cutter. See Cigar cutter. Potato cutter. Sod	405 202	Pipe maki Planter, V Planter, c
	cutter. Dental chair, S. T. Henkle Disintegrating jute, etc., machine for, P. H. Wait Disintegrating roller, W. H. Larman Door securer, J. H. Matthews Dredging implement, J. Hatch Drier. See Clothes drier. Dumbwaiter safety catch. H. K. Smith	485,246 485,283	
	Door securer, J. H. Matthews	485,205 485,193	Planter, s Plaster, w Plow, J. P
	Drier. See Clothes drier. Dumbwaiter safety catch, H. K. Smith Dynamo, W. H. Elkins. Eaves trough, L. S. Bonbrake. Electric infermutator, H. G. • Neill. Electric infermutator, H. G. • Neill. Electric machine, dynamo, D. Pepper, Jr. Electric machine regulator, dynamo, E. Thomson Electric signal, G. McIntosh. Electric switch, J. C. • Neil. Electric trolley system, underground, R. B. Ayres.	485,569 485,181	Plow, grui
	Eaves trough, L. S. Bonbrake Electric intermutator, H. G. O'Neill	485,573 485,425	Fox
	Electric machine, dynamo, D. Pepper, Jr Electric machine regulator, dynamo, E. Thomson	485,220 485,239	Plumb bol Pocketboo Potato cu
	Electric signal, G. McIntosh. Electric switch, J. C. •'Neil	485.352 485,558	Power tra Press. Se Pressure
	Ayres Electrical heater, H. G. •'Neill	485,252 485,424	Pressure i
	Thomas	485,238	Printing p
١	Elevator. See Grain elevator. Elevator gearing, N. C. Bassett	485,163 485,574	Propeller, Proportio
١	Elevator. See Grain elevator. Elevator gearing, N. C. Bassett. Enamel for metal articles, H. Claus. Engine. See Locomotive engine. Steam engine. Engine houses, electrical doortrip for, A. Bosch. Evaporating apparatus, vacuum, H. T. Yaryan. Exhibitor, picture, W. C. Fawkes. Extensible brace, W. J. Dunn. Extractor. See Stume extractor.	485,367	Pulley, po Thoma Pump, B.
١	Expansion apparatus, vacuum, H. T. Yar yan Exhaust head, J. L. Hornig Exhibitor, nicture, W. C. Fawkes	485,315 485,195 485,464	Pumps, at F. A. Punch, Ba
ı	The state of the s		Punching Wrigh
1		485,448 485,529	Puzzle, A. Rail brace Railing, in
١	Bruhn Faucet, W. W. Riner Feathers, making imitation long heron, S. Lewin-	485,430	Railway,
١	Feed steaming apparetus for animals, A. J.	200,020	Railway t Railways ley bai
	Ventzki Feed trough, Flurey & ⊕'Leary. Fence, W. J. Jacobs. Fence, J. Spillinger.		Reclining Reel. See
	Fence, J. Spillinger. Fence weaving machine, W. Lowden. Fertilizer distributer, J. Fraser. File for bills, periodicals, etc., A. A. Thompson. Filter, T. T. & W. Ø. Luscombe. Fire extinguisher or sprinkler, automatic, J. H. Wilson.	485,304 485,418 485,269	Refrigera Register. Regulator
	File for bills, periodicals, etc., A. A. Thompson Filter, T. T. & W. O. Luscombe	485,514 485,551	Rigid and Rock crus
١	Wilson	485,519 485,301	Roller. S Roof, G. I Rotating
١	Fireplace heater, open, G. R. Scates. Fishing fly book, D. K. Howe. Fishing reel, J. H. Mount. Flour bin and sifter, F. K. McCague.	485,582 485,208	Roundabe Rubber fa
١	Flower holder, S. Lord	485,210 485,417	Safety pin Salt holde Sand rope
l	Frasing machine, A. A. Barthelmes	485,171 485,162	Sash fast Sausage s
i	rurnace. See Glass Iurnace. Glass melting Iurnace.	495 19n	Sawmill s Sawmill s Saw tooth
	Furnace grate bar, E. Bolleau. Gauge. See Pressure gauge. Shingle gauge. Galvanic battery, W. A. Crowdus. Garment hook, J. Killinger. Gas burners in their holders, machine for securing incandescing bodies for, Fahnehjelm & Daliwir	485,527	Scaffold, i
	Garment hook, J. Killinger. Gas burners in their holders, machine for secur-	485,319 485,389	Scalpel, Scourer. Screen.
			Screwdriv Screw thr
	Gas burners, machine for manufacturing lameliæ or needles for incandescent, Fahnebjelm & Dellwik		Seal, bag, Seal press Separator
	Dell wik. Gas producer, W. A. Koneman Gaseous fuel, burner for burning, H. Adler	485,391 485,594	Sewing m
1	Gate. See Sliding gate. Generator. See Steam generator. Girth fastener. H. M. Tileston	485,481	Sewing m Sewing m ing
ı	Glass furnace, R. M. Atwater	485,340 485,3 9 0	Sewing m
	Governor, engine, F. J. Waters	485,361 485,520	Sewing m Kemp Shaper an
	Grain scourer, H. A. Barnard. Grain scourer, W. A. Cockrell.	485,525 485,488	Sheet me Shingle g Shirt, Cul
	Gate. See Sliding gate. Generator. See Steam generator. Girth fastener, H. M. Tileston. Glass furnace, R. M. Atwater. Glass melting furnace, J. Kitson Gopher trap, G. Moor. Governor, engine, F. J. Waters. Grain elevator, J. A. L. Wilson. Grain scourer, H. A. Barnard. Grain scourer, H. A. Cockrell. Grate, Carel & Davidson. Guns, automatice jecting mechanism for break- dwn, C. B. Withington. Halter, H. F. Hutton.	485,313	Shoe, G. I
	Halter, H. F. Hutton. Hammer, pueumatic, G. Glossep. Hammer, pueumatic, G. Grackshapk. 485 168	. 485,278 . 485,498	Sign and Signal. S Slating co
	acount C. B. Witnington Halter, H. F. Hutton, G. Glossep. Hammer, power, F. C. Breoksbank	485,258	Sliding ga
	Harness machine, C. J. Cooper	485,360 485,365	Smoke sta Sniping n Sod cutte
	Harrow, spring tooth, H. W. Eisenhart	. 485,493 . 485,324	Sodawate ing, J.
	Harvester, corn, J. Bardill	485,522 485,349	Soldering Sole, G. H Spool hole
	beater.		Sprinkler
	heater. A. Graf. Heater. A. Graf. Heating apparatus, E. P. H. Kelting. Heating device, tool. J. R. Morgan	. 485,190 . 485,388 . 485,584	Square ar Square, se
ĺ	Heating device, tool, J. B. Morgan. Hinge, lock, J. W. Dearing. Hinge, spring, L. Bommer. Holdback, vehicle, Langer & Peterson.	485,584 485,460 485,366	Stamp, ca Stave cut
	Holdback, vehicle, Langer & Peterson. Holder. See Flower holder. Label holder. Salt holder. Spool holder. Ticket holder.	. 485,550	Steam bo Steam bo Steam en
	Horseshoe calk sharpening device, A. J. Neal Hydrant, fire, H. F. Havden	. 485,470 . 485,585 . 485,444	Steam ge Steam joi Steam mo
	Hydraulic motor, F. Johnson Induction device, self, W. Stanley, Jr	. 485,412 . 485,336	Stereosco Stoker, re
	ink well for school desks, Morden & Gilmour Inkstand, M. Faust	. 485,595 . 485,375 . 485,307	Stopper. Stove, oil Stove, oil
	Ironing machine, A. R. Gustafson Jail or vault construction, D. K. Sbourne	485,465 485,506	Stove scr Straw sta
	Jewel settings, machine for truing, T. Gill Journal box, J. Z. Nyquist	. 485,410 . 485,213	Street sw Stump ex Surgical s
3	Houseshoe, W. J. & M. J. Mohan. Horseshoe calk sharpening device, A. J. Neal. Hydrant, fire, H. F. Havden Hydrant, fire, H. F. Havden Hydrant fire, H. F. Havden Hydrant fire, H. F. Havden Hydrant fire, H. F. Havden Ink well for school desks, Morden & Gilmour. Ink stand, M. Faust. Inkstand, M. Faust. Inkstand, self-closing, C. R. Straughn. Ironing machine, A. R. Gustafson Jail or vault construction, D. K. Ssbourne. Jails, construction of, D. K. Osbourne. Jewel settings, machine for truing, T. Gill. Journal box, J. Z. Nyquist. King bold, J. Friar. Kitchen utensil, H. B. Wiley Knife, J. J. Eberbard Kniffs handle, J. H. Bennett Knitting machine, J. Bennor. 485,316 Label holder, C. E. Wheeler.	485,496 485,312 485,284	Switch of Switch of Table slie
-	Knife handle, J. H. Bennett	· 485,166 · 485,317	Table sile Tackle bl
J	Lapel holder, U. E. Wheeler	. 485 310	Saffor

8 1 8 3 6 2 2	Lace fastening hook, J. Walden. Lamp, electric arc, E. A. Edwards. Lamp, electric arc, J. A. Joshus Lamp, electric arc, J. A. Wisher. Lamp, electric arc, J. A. Moswles. Lamp, incandescent electric, E. Pollard. Lamp socket, incandescent electric, Potter & Cartwright. Lathe dog, J. H. Brinton, Jr.	485,247 485,537 485,347 485,327 485,293 485,478
989228833	Lawin sprinkler, traveling, H. T. Crepeau 183,5-32, Lighting, incandescent, J. Landin Liquid regulator, M. Poschinger Liquors or distilled spirits, process of and appa- ratus for purifying and maturing, I. B. Cush-	485,587 485,405 485,533 485,281 485,563
3 3 9 35 88 86 96	Lobster shipping apparatus. A. McGray Locomotive bell ringer, E. D. Bangs Locomotive engine, M. N. Forney. Loom let-off motion, J. M. Linscott. Loom wert fork, E. L. Hersom Lubricator, J. V. Clark Mat drving and germinating apparatus. J. H. E.	
)6 3 0 7	Rathmann. Measure and funnel, combined, D. T. Holt. Measuring machine, bagging, D. J. Denton et al Metal work, structural, A. Coffin. Metals, method of and apparatus for electro-de- position of, C. R. Fletcher. Metals, method of and apparatus for recarburiz-	485,355 485,545 485,491 485,489 485,343
15 15 17 9	ing, W. A. Koneman. Meter. See Water meter. Moulding, J. M. Glover. Mosquito canopy, for folding beds, A. H. Eva Motion, apparatus for transmitting, C. H. F. Russmann. Motor. See Hydraulic motor. Rotating motor. Sewing machine motor. Steam motor.	485,377 485,494
36 14 14 37	Motor J. C. Lueneburg Multitubular boller, M. Selpp Music leaf turner, J. N. Camp Musical instrument, J. Harrington Necktie, J. B. Beam Nursery chair, F. L. Hemmer Nut, axle, J. Gambetta. Nut lock, A. G. Cox.	485,419 485,507 485,255 485,542 485,447 485,382 485,497
22 74 09 28 38 28	Nut lock, A. G. Cox. oli spraving device, C. R. Collins. ore feeder, E. A. Langford. ore separator, centrifugal, O. B. Peck. Oven, rotary, P. C. H. Rudd. vatalzing apparatus, E. A. Rusden. Packing, lubricating, B. Edgar. Packing, piston, F. N. Etbridge.	185.30
92 31 72 85	Pad. See Harness pad. Paper calendering machine, P. Dillon Paper cutter, Pavyer & Burns Paper making machine, L. P. Clawson Parchmentized fiber tubes, manufacture of, R. P. Frist Pen and pencil holder, A. A. Lytle Pen or pencil carrier, H. E. Thornhill	485,534 485,586 485,575 485,408 485,552
50 04 31 71 55 72	ren, ruing, J. S. Soderin. Pencil case, Crowe & Massam. Piano or organ, upright, C. Keidel, Jr. Picket and shingle pointing machine, G. B. Russell. Pile of woven fabrics, machine for raising the	485,440 485,358 485,261 485,414 485,431
70 42 33 46 33 05	W. D. Watson	485,242
93 69 81 73 25 87	Planter, orn, T. W. Verlin, Planter, cotton seed, W. S. West. Planter, seed, S. G. Randall. Plaster, wall, C. L. Denison, Plow, J. P. Couch. Plow, J. E. & E. M. Mitchell. Plow, grup, J. P. Weatherman. Plow, stock, T. Brooks, Plows, harrows, etc., riding attachment for, C. D. Fox. Plumb bob, H. M. Fuller.	485,184 485,376
20 39 52 58 58	Pressure regulator for compressed air machines.	
38 63 74 37	E. C. Fasoldt. Printing press bed motion, J. W. Cribbins. Printing press perforator, Kastenhuber et al. Propeller, chain, C. W. & C. H. Threlkeld. Proportional meter, multiple, J. Thomson. Pulley, power transmitting friction clutch, C. W. Thomas. Pumps, B. Wright. Pumps, automatic governing device, for electric	
95 64 42 48 29	Pump, B. Wright Pumps, automatic governing device for electric, F. A. Pocock. Punch, Baumener & Harting Punching and marking machine, check, G. Wright Wright Rail brace and tie plate, combined, D. F. Holman Railing, iron, T. H. Flynn	485,314 485,38
29 99 80 97	Railway, chair, B. N. Payne. Railway grip, cable, P. T. Taylor Railway track foot guard, M. Riley. Railways underground electric conduit and trolley bar for electric, J. S. Moss. Reclining chair, C. H. Hacklaender. Reel, See Fishing reel, Sand rope reel.	485,236 485,236 485,486 485,556 485,278
04 18 69 14 51 19 01	Refrigerating apparatus, C. H. Parshall	485,290 485,51
82 08 10 17 71 62	Konler. See Disintegrating Folier. Roof, G. F. Ullmann. Rotating motor, A. Springer Roundabout, J. F. Fralinger Rubber fastener, I. A. Sberman Safety pin, A. E. Divine Sait holder, H. A. Lee Sand rope reel, W. A. Lloyd Sash fastener, A. A. Page. Sausage stuffing machine, J. Eppler.	100,000
89 27 19	Sana Tope reel, W. A. Lloya. Sash fastener, A. A. Page. Sausage stuffing machine, J. Eppler. Sawmill dog, M. M. Appleman. Sawmill set works, J. T. Rice. Saw tooth, tubular insertea, L. L. Lewis. Scaffola, builder's, J. E. Ennis. Scaffola, roof, J. B. Cottom. Scaffola, F. Stennie. Scourer. See Grain scourer. Screen. See Stove screen.	
22 91 94	Screwfiver, pendant set, D. Mendelson. Screw threading machine, F. F. Voigt. Seal, bag, W. D. Kenyon. Seal press, E. J. Brooks. Separator. See Fe separator. Sewing machine, J. H. Clark. Sewing machine, J. A. Cuming. Sewing machine fan attachment, G. W. Miller. Sewing machine fae feeling mechanism, A. A. Cum-	400,01
81 40 80 21 61	Sewing machine motor, A. H. Clayton Sewing machine tension device, C. B. Hunt	485,48 485,54
20 25 88 50 13 78 98	sewing machine trimming attachment, forces & Kemp Shaper and cutter head, J. J. Quinn. Sheet metal folding machine, M. E. Hastings. Shingle gauge, adjustable, J. B. Sykes. Shirt, Guiver & Hascall Shoe, G. P. Herndon. Shoe, ventilated, L. R. Eastman. Sign and price current, combined, J. V. Reed Signal. See Electric signal. Slating compound, J. B. Coles.	485,19: 485,49: 485,54: 485,54: 485,18: 485,22:
58 60 05 154 .93	Slating compound. J. B. Coles. Sliding gate, J. A. Newton. Smoke escape, G. L. Barrett. Smoke stack and conductor, Duncan & Quinby Sniping machine, N. J. White. Sod cutter, G. F. Wagner. Sodawater, method of and apparatus for charging, J. H. Vinton. Soldering tool, E. L. Barber. Sole, G. H. Crocker. Spool holder, A. F. Morgan. Spoon holding attachment, J. Staren. Sprinkler. See Lawn sprinkler.	485,45 485,21 485,52 485,53 485,40 485,44
190 188 188 184	Ing. J. H. Vinton. Soldering tool, E. L. Barber. Sole, G. H. Crocker. Spool holder, A. F. Morgan. Spoon holding attachment, J. Staren. Sprinkler. See Lawn sprinkler. Square and bevel, combined try, T. R. Cook.	. 485,24 . 485,16 . 485,45 . 485,20 . 485,51
184 160 186 186 186 186	Sprinkier. See Lawnsprinkier. Square and bevel, combined try, T. R. Cook. Square, separable, F. W. Wohlfert. Stairway, spiral, Borneman & Daab. Stamp, canceling and dating, W. G. Moseley. Stave cutting machine, barrel, C. W. Rich. 485,565 Steam boiler, E. Reynolds Steam boiler, E. Reynolds Steam engine, J. W. Sargent. Steam engine, J. W. Sargent. Steam generator, Fitzgibbons & Eason. Steam generator, Morrison & Gripn.	. 485,44 . 485,47 , 485,56 . 485,29 . 485,43 . 485,43
170 185 109 112 136 195	Steam joint, concentric, J. B. Morgan. Steam motor, E. A. Edwards. Stereoscope, coin-controlled, J. Ringen. Stoker, revolving, N. W. Pratt. 485.223	. 485,59 . 485,53 . 485,56 . 485,22
875 897 865 865 865 810 813	Stopper. See Böttle stopper. Stove, oil. G. Gardner. Stove, oil. J. Goldstein. Stove screen and fender, J. Adrianson. Straw stacker attachment, S. G. Scholz (r). Street sweeping machine, M. V. B. Ethridge. Stump extractor, G. W. Smeal. Surgic al splint, E. Densmore. Switch. See Circuit switch. Switch operating device, B. Bartelmes. Table slide extension Baird & Johnson.	485,53 485,37 485,36 11,28 485,57 485,50 485,17
96 312 264 166 317 310	Tackle block, R. B. Meeker	485,50

OIL-LIME-ELECTRIC

Telegraphy and telephony, combined, W. W.	
Jacones	485 279
Telephone. A. C. White	485,311
Thill coupling, C. C. Bradley	485,368
Thill coupling, E. F. Hopkins	485,194
Jacques Telephone, A. C. White Telephone, A. C. White Thill coupling, C. C. Bradley Thill coupling, E. F. Hopkins Thill coupling, E. K. Pfleiger Thrashing machine band cutter and feeder, F. R. Hill Ticket holder, M. Lincoln The See Bale file	480,420
Hill	485,499
Ticket holder, M. Lincoln	485,202
Timerecorder, watchman's electric, J. A. Tilden. Tin and terne plates, apparatus for cleaning, T.	485,591
Tin and terne plates, apparatus for cleaning, T.	485,387
Jenkins. Tobacco for cigarettes, machine for preparing or	2001001
Tobacco for cigarettes, machine for preparing or reducing and comminuting, S. Abojador	485,483
Track cleaner, C. E. Bostwick	485,528
Track cleaner, C. E. Bostwick	485,348
Trains, electric danger signal for moving, McCart	485,473
& Judkins Trap. See Animal trap. Gopher trap.	
Trip fastener, F. A. Stevens	485,511
Truck, J. C. A. Dean	485,262
Truck, car, A. T. Loyd	485,286
Twigting machine to roll 1 E Fitzgerald	485 266
Typewriting machine, Vaughan & Evans	485,593
Valve for pneumatic tires, W. E. Gibbs	485,540
Valve gear, Unzicker & Masel	485,360
Valve gear, steam engine, J. W. Sargent	480,400
Fasoldt	485,579
Valve, slide, H. Moon	485,505
Trap. See Animal trap. Gopher trap. Trip fastener, F. A. Stevens. Truck, J. C. A. Dean. Truck, G. A. T. Loyd. Tuyere, J. M. Hartman. Twisting machine to roll, J. E. Fitzgerald. Typewriting machine, Vaughan & Evans. Valve for pneumatic tires, W. E. Gibbs. Valve gear, Unzicker & Masel. Valve gear, steam engine, J. W. Sargent. Valve operating mechanism, engine, E. C. Fasoldt Valves, ide, H. Moon Valves, cut-off mechanism for-slide, Fletcher & Abell.	405.00
Valves, cut-off mechanism for-slide, Fletcher & Abell. Vegetable cutting er slicing machine, Smith & Claydon	485,267
Claydon	485,590
Velocipede, aquatic, J. F. Breyer	485,369
Velocipede, ice, M. B. Gibson	485,345
Velocipede, ice, G. Seebick	485,335
Vessel hulls construction of C. D. Doxford	485 462
Vessels, apparatus for raising sunken, Tyler & De	ACD, EUN
Vesian	485,398
Wagon, T. B. Moses, Jr	485,292
Wagon du mping C. H. McRober s	485,332
Wainscoting enameled iron, F. D. Cook	485,259
Wardrobe, D. B. Weightman	485,309
Warpers, beam doffer for, J. E. Prest	485,225
Weter closet cistern Manzies & Morgan	185 460
Water gauge reflector, E. C. Carleton	485,451
Water meter, disk, J. Thomson	485,437
Water meter, positive proportional, J. Thomson	485,438
Water wheel, C. W. Huson	485,196
Wheel. See Water wheel. Wind wheel.	400,411
Wick lifting device, F. Rhind	485.429
Wind wheel, T. J. Harrison	485,380
Wind treatment of aperbling A Welfard	485,515
Wire reel holder. H. Hanson	485,275
Wire reeling and stretching machine, J. Harper.	485,541
Wire winding apparatus, F. B. Chase	485,256
Vessel nuins, construction of, c. F. Doxford De Vesian Wagon, T. B. Moses, Jr. Wagon brake, J. Newbill Wagon, du mping, C. H. McRober s. Wainscoting, enameled iron, F. D. Cook. Wardrobe, D. B. Weightman Warpers, beam doffer for, J. E. Prest. Watchcase pendant, T. A. Hopkins. Water closet cistern, Menzies & Morgan Water gauge reflector, E. C. Carleton. Water meter, disk, J. Thomson. Water meter, disk, J. Thomson. Water wheel, C. W. Huson. Water wheel, C. W. Huson. Water wheel bucket, J. B. Pitchford. Wheel. See Water wheel. Wind wheel. Wird fifting device, F. Rhind. Wird wheel, T. J. Harrison. Wirdings, hauling, F. Uhlig. Wine, treatment of sparkling, A. Walfard. Wire reeling and stretching machine, J. Harper. Wire winding apparatus, F. B. Chase.	

DESIGNS.

Badge, M. C. Shafer	21.9
Boot, lady's, H. C. Richardson	21.9
Box. L. Schwarz	21.9
Castanet, G. W. Hull	21.9
Monument, K. L. Lehmann	21.9
Postal card, Girsch & Roehsler	21,9
Spoon, Bates & Quimby	21.9
Urinal, E. Hammann	21,9
Wall paper. C. Booze	21,9

TRADE MARKS.

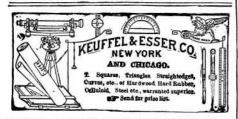
Alcohol, mint, E. De Ricqles et Cie	21,900 21,903
for dispensing powders, liquids, and semi-	
liquids, McKesson & Robbins	21,905 21,929
Files, chisels, scopers, gravers, and similar tools,	
Grobet Freres	21,904
Flour, wheat, Buffalo Milling Company	21,920
Medicated snuff, A. M. Fisher. Medicinal herb teas, Moki Herb Remedy Com-	21,930
Dany	21,922
pany Pens, steel and other, E. R. Oeitinger & Co.,	,
Pariodicals —achir V Bosenthal	21,916
Periodicals, weekly, L. Rosenthal	21,926
Rubber and leather goods, certain named, Page	, '
Belting Company	21,924
Saws, W. B. Barry	21.921
Soap for belt dressing, M. F. Delnow	21,923
Suits, boys' and children's, A. Levy & Co	21,927
Yarns, knitting and mending cotton, Tucker & Cook Manufacturing Company	21.901
COL ELECTION COMPANY THIS INTERNATIONAL	,001

A printed copy of the specification and drawing of any patent in the foregoing list, orany patent in print issued since 1883, will be furnished from this office for 25 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list, provided they are simple, at a cost of \$40 each. If complicated the cost will be a little more. For full instructions address Munn & Co., 321 Broadway, New York. Other foreign patents may also be obtained.

Movertisements.

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. Engravings may head advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.





The Cheapest, The Best

A complete Electric Motor and Battery Outfit, instructive and en-tertaining for old and young, ope-rating by means of our patented battery pads, doing away with li-quid acids and chemicals. Sent nd acids and chemicals. Sent y mail or express, prepaid, on ceipt of \$1.25. Electro-Novelty or. Roxbury, Mass. Mfrs. of Toy by the send for catalogue. See "Sci. Am." July 23d



BEATTY Pianos. Organs, \$33 up. Want agents. Cat'g free. Dan'l F. Beatty, Wash'ton. N. J.

Improved Screw Cutting Foot and Power

Drill Presses, Shapers, Band, Circular, and Scroll Saws Machinists' Tools and Supplies. Lathes on trial.

Catalogue mailed on application.

SEBASTIAN LATHE COMPANY, 120 and 122 Culvert Street, Cincinnati, O.





L WELL SUPPLY CO. 91 & 92 WATER STREET, Pittsburg, Pa., Manufacturers of everything needed for Pittsburg, ra., Manufacturers of everything needed for ARTESIAN WELLS for either Gas, Oil, Water, or Mineral Tests, Boilers, Engines, Pipe, Cordage, Drilling Tools, etc. Illustrated catalogue, price lists and discount sheets on request.



RESEARCHES AS TO THE PROPER ties of Alloys—By Prof. W. C. Roberts-Austen, F.R.S. An investigation of the effects of small admixtures of certain elements on the mechanical and physical properties of metals. With 15 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 856. Price 10 cents. To be had at this office and from all newsdealers.

Teach Yourself Music with Buckner's Chart. Simple and easy method. No previous knowledge of music required. Regular price \$1.00; our special price only 30 cents. Stamps will do. Thompson Music Co., 367 Wabash Ave, Chicago.

Steel Type for Writing Machines, J. D. MALLONEE, M'f'r, STOCKTON, N. Y.

ALUMINUM

In all shapes. Manufactured by Cowles Electric Smelting and Aluminum Co. Correspondence solicited. LOCKPORT, N. Y.

BUSINESS

The value of the SCIENTIFIC AMERICAN as an adverising medium cannot be overestimated. Its circulation is many times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. This he has when he advertises in the SCIENTIFIC AMERICAN. And do not let the advertising agent influence you to substitute some other paper for the SCIENTIFIC AMERICAN, when selecting a list of publications in which you decide it is for your interest to advertise. This is frequently done for the reason that the agent gets a larger commission from the papers having a small circulation than is allowed on the SCIENTIFIC AMERICAN.

For rates see top of first column of this page or address MUNN & CO., Publishers,

361 Broadway, New York





LIFE OF AN ANT.—BY E. A. BUT-ler. An entertaining paper on the life of an ant from the egg to the mature state. With an account of the curious habits of these insects. With 4 illustrations. Contained in Scientific american Supplement, No. \$57. Price 10 cents. To be hadat this office and from all newsdealers.



GAS ₩ GASOLINE ENGINES

Dwarfs in Size, but Giants in Strength.



GAS & GASOLINE ENGINE CO. Cincinnati, O.



THE ARMSTRONG MACHINES,



our Stocks and Dies, which are universally a edged to be THE BEST. 12 Send for catalog. THE ARMSTRONG MFG. CO., Bridgeport, Ct.

The Sebastian-May Co Improved Screw Cutting Foot & LATHES

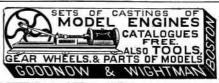
Drill Presses, Chucks, Drills, Dogs, and Machinists' and Amateurs' Outfits. Lathes on trial. Catalogues mailed on application. 165 to 167 Highland Ave., SIDNEY, OHIO.

SPECIAL NOTICE!

Two handsome photo-engraved display sheets "Recent Improvements in Air Compressors,"
"Recent Improvements in Rock Drills,"
mailed free to any one who will cut out this
advertisement and mail it to us with his name

INGERSOLL-SERGEANT DRILL CO. No. 10 Park Place, New York, U.S. A.





SECOND-HAND MACHINERY FOR SALE AT VERY LOW PRICES.

One 72x72x16 Iron Planer; one 60x60x20 Iron Planer; one 48 in. Swing Holly Lathe; one 19% in. diameter, 30 in. stroke, Single Cylinder Poppet Valve. Horizontal Steam Engine good as new. Write for prices.
HOLLY MANUFACTURING CO., LOCKPORT, N. 7



WHAT ELECTRICITY IS.—BY W. W Jacques. An interesting discussion of the subject, illustrated with some new experiments. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, NO. 857. Price 10 cents. To be had at this office and from all newsdealers.



CHANDLER'S Micrometer Holder

It allows the hand to be free to use the adjusting screw while the other holds the work. Price 50 cents. CHANDLER & FAROUHAR No. 179 Washington Street,
BOSTON, MASS.
Send for Catalogue of Tools.



Perfect Newspaper File

The Koch Patent File, for preserving Newspapers, Mag agines, and Pamphlets, has been recently improved and price reduced. Subscribers to the SCIENTIFIC AMERICAN SUPPLEMENT can be supplied for the low price of \$1.50 by mail, or \$12.5 at the office of this paper. Heavy board sides; inscription SCIENTIFIC AMERICAN in git. Necessary for every one who wishes to preserve the paper. Address MUNN & CO., Publishers SCIENTIFIC AMERICAN.

LANTERNS, STEREOPTICONS AND VIEWS.

Large Catalogue Free.

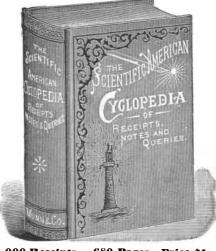
J. B. COLT & CO. [189 La Salle Street, Chicago, IL.

FOR RENT, WATER POWER.—Day use of 25% b. p. (night power used for Electric Light plant). Good railroad facilities. Town of 6,000 population. Address Riverside Water Company, Riverside, California.



NOW READY!

A NEW AND VALUABLE BOOK,



12,000 Receipts. 680 Pages. Price \$5.

12,000 Receipts. 680 Pages. Price \$5.

This splendid work contains a careful compilation of the most useful Receipts and Replies given in the Notes and Queries of correspondents as published in the Scientific American during the pat fifty years; together with many valuable and important additions.

Over Twelve Thousand selected receipts are here collected; nearly every branch of the useful arts being represented. It is by far the most comprehensive volume of the kind ever placed before the public.

The work may be regarded a the product of the studies and practical experience of the ablest chemists and workers in all parts of the world; the information given being of the highest value, arranged and condensed in concise form convenient for ready use.

Almost every inquiry that can be thought of, relating to formulæ used in the various manufacturing industries, will here be found answered.

Instructions for working many different processes in the arts are given.

It is impossible within the limits of a prospectus to give more than an outline of a few features of so extensive a work.

Under the head of Paper we have nearly 250 receipts, embracing how to make papier maché; how to make paper water proof and fire proof; how to make sandpaper, emery paper, tracing paper, transfer paper, carbon paper, parchment paper, colored papers, razor strop paper, paper for doing up cutlery, silverware; how to make luminous paper, photograph papers, etc.

Under the head of Inks we have nearly 450 receipts, including the finest and best writing inks of all colors, drawing inks, luminous inks, invisible inks, gold, silver and bronze inks, white inks; directions for removal of inks; resteration of faded inks, etc.

Under the head of Alloys over 700 receipts are given, covering a vast amount of valuable information.

Of Cements we have some 66 receipts, which include almost every known adhesive preparation, and the modes of use.

How to make Rubber Stamps forms the subject of a most valuable practical article, in which the complete pr

tography and Microscopy are represented by 600 receipts.

Under the head of Etching there are 55 receipts, embracing practical directions for the production of engravings and printing plates of drawings.

Paints, Pigments and Varnishes furnish over 800 receipts, and include everything worth knowing on those subjects.

Under the head of Cleansing over 500 receipts are given, the scope being very broad, embracing the removal of spots and stains from all sorts of objects and materials, bleaching of fabrics, cleaning furniture, clothing, glass, leather, metals, and the restoration and preservation of all kinds of objects and materials.

In Cosmetics and Perfumery some 500 receipts are given.

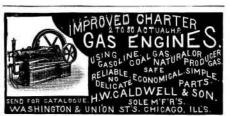
In Cosmetics and Pertumery some 500 receipts are given.
Soaps nave nearly 300 receipts.
Those who are engaged in any branch of industry probably will find in this book much that is of practical value in their respective callings.
Those who are in search of independent business

or employment, relating to the home manufacture of sample articles, will find in it hundreds of most excellent suggestions.

Send for descriptive circular.

MUNN & CO., Publishers, SCIENTIFIC AMERICAN OFFICE.

361 Broadway, New York.





PERFORATORS OF ALL METALS

For Cotton, Oil and Rice Mills, Sugar Houses, Distilleries, Phosphate and Fertilizer Works, Mining and Concentrating, Gas and Water Works, Elevators, Threshers, Separators, Corn Shellers, and all kinds of Grain Cleaning Machinery. Heavy Steel and Iron Plates and Cylinders for Screening Ore, Coal, Stone. For Filters, Strainers, Ventilators, Oil, Gas and Vapor Stoves and all special purposes. Special sizes for Coffee Cleaning and Roasting Machinery. Pe forated Tin and Brass.

The Harrington & King Perforating Co. Chicago, and 234 Pearl St., N. Y