

See sickness	240	Argon	92	Card grinder	157	Corn sheller	13, 60, 77(2), 108, 155, 171, 173, 205, 222, 341, 365, 381, 397	Eye water	141	
Seasonable hints	314	Agricultural machine	294	Cards, shuffling and dealing	318	Corns, etc., curing	173	Eye-glass	44, 190, 238	
Self-education	333	Air carbureter, 60, 185, 222, 290, 383, 389	294	Carding engine waste saver	317	Corpses, preserving	232	Eyebrow	188	
Senses, speed of the	102	Air condenser	77(2)	Carding engine winding frame	173	Corset	173	Eyelid	188	
Sensitive plant, mechanism of	383	Alkali can	383	Carding machine alarm	155	Cotton bale tie	60, 109, 140, 304, 220, 232	Eyelid machine	27, 45, 403	
Shafts connected by pitmans	240	Alkali putting up	383	Carpenter's plane	27	Cotton cleaner	138, 187	F		
Sharpening saws	333	Alum porons	387	Carpenter's vice	27	Cotton compress	334	Fan	175, 379	
Sheep protected from dogs	373	Amalgamator	71, 125, 189, 367, 383	Carpet bag	339	Cotton gin	380, 381	Fanning attachment, chair	12	
Shemell of Russia	131	Anchor	294, 380, 383	Carpet bag frame bender	347	Cotton gin ring turner	12	Fanning mill 171, 304(2), 305, 332, 341		
Ships, canal, the Darien	329	Andiron and fireplace	29	Carpet lining	199, 221	Cotton machine screen	140	Fatty acids, solid	255, 305	
Ships, resistance and immersion of	314	Animal dyes	220, 317	Cotton press	205, 221, 343	Cotton planter	140	Faucet 11, 107, 138(3), 158, 204(2), 215, 221, 226		
Shoeburys experiments	314	Animal power	220	Cotton seed cleaner	123	Cotton planter	140	Faucet filter	109	
Siemens furnace	323	Animal substances, preserving	220	Cotton seed for planting	62	Cotton roller	171	Feather renovator 60, 71, 78, 124, 158, 159, 160, 221, 401		
Significant fact	226	Angler's reel	331	Cotton spinner	171	Cotton waste, cleaning	103, 125	Feathers, bleaching, etc.	188	
Silk and its culture	323	Annular pit, car wheel	349	Cough mixture	399	Cough, infant's	172	Feed bag	349	
Silk manufacture, American	282	Annular pot, etc.	61	Counter brace	283	Coughing	172	Feed cutter	318, 349	
Silk reeling, comparative	323	Annular	383	Counterfeiting preventer	380, 397	Cotton gin	380, 381	Feed rack	76, 123	
Size versus numbers	371	Apothecaries' labels	205	Coutersink	302	Cotton gin ring turner	12	Feed water heater 44, 46, 110, 155(3), 157, 158, 159, 315, 318, 349		
Skull, a wonderful	378	Apple corer, etc.	78(2), 93, 125, 140, 222	Cover, chamber vessel	171	Cotton planter	140	Felly dresser	78	
Sleep—amount necessary	185	Apple grinder	222	Culinary apparatus	107(2), 203	Cotton roller	171	Felon compound	156	
Small potatoes	224	Archer's hooks and dasher falls	300	Culinary vessel	59, 173, 187, 265	Cotton seed cleaner	123	Felted fabric	94, 270, 380	
Smoke and vegetation	373	Archer box	347	Cultivator 13, 28(2), 29, 43, 48(2), 44, 45(2), 50(2), 77, 78, 92(2), 110(2), 124, 134, 141(2), 155, 156, 171, 188, 209(3), 220(2), 221(2), 247(2), 252, 253, 257, 258(2), 283, 284, 285, 286, 300(2), 301, 302, 310(2), 317, 318, 319(2), 322, 323, 324, 325, 326, 330, 341, 355, 356, 380, 381(2), 382, 383, 385, 386(2), 397(2), 404(2)	Culinary apparatus	107(2), 203	Cotton seed for planting	62	Felted machine	124, 157(2)
Smoke wreaths	373	Arches, tunnels, etc.	189	Culinary vessel	59, 173, 187, 265	Cotton seed for planting	62	Fence, iron	221, 267, 283, 300, 347, 363	
Snow sheds, 40 miles of	378	Arithmetical game	381	Cultivator 13, 28(2), 29, 43, 48(2), 44, 45(2), 50(2), 77, 78, 92(2), 110(2), 124, 134, 141(2), 155, 156, 171, 188, 209(3), 220(2), 221(2), 247(2), 252, 253, 257, 258(2), 283, 284, 285, 286, 300(2), 301, 302, 310(2), 317, 318, 319(2), 322, 323, 324, 325, 326, 330, 341, 355, 356, 380, 381(2), 382, 383, 385, 386(2), 397(2), 404(2)	Culinary vessel	59, 173, 187, 265	Cotton seed for planting	62	Fence, portable 13, 60, 76, 91, 124, 129, 209, 348	
Social Science Congress	196	Armor plating for vessels	134	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence post driver	108, 140, 189	
Soda lakes of Mexico	184	Artisan pump	12, 219	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence post, iron	349	
Solar eclipse, results of observing	326	Artificial fuel	12, 219	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence raiser	344	
Solar heat	179	Artificial leather belting	91	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence, river	26	
Something worth considering	384	Artificial leg	141, 317	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence, wire and picket	75, 355, 401	
Spain, travel reminiscences of	384	Artificial stone	221, 222, 267, 349	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fence wire stretcher	171	
Spectroscope and motion of stars	273, 276	Artificial teeth	138, 143	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fences, foundation for	107	
Spiritualism, mechanics of	329	Artists' stretching frame	109	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Ferry bridge	189, 193	
Stamp eraser, \$20,000 for	38	Artists' stretching frame	109	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fertilizer	29, 31	
Standard for bolts and nuts	41	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fever and ague remedy	29, 153	
Steam boiler explosions, cause of	229	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fiber and gum fabric	188	
Steam boiler fireproof covering	361	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Field marker	15, 235, 381, 388	
Steam boiler and steam	361	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fifth wheel bender	60, 301	
Steam boiler, explosive gases in	34, 118	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	File cutter	76, 121	
Steam engine crank, apparent va-	320	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	File fastener	61, 206	
Steam engine, radiator	354	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	File handle	61, 206	
Steam engines, modes of testing	371	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Files and rasps	109	
Steam navigation improvements	371	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Filter	171, 222, 307, 355	
Steam returned to the boiler	371	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Filtering press	92	
Steam valves, pressure on	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Finger ring	352	
Steamers above Omaha	264	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire alarm	45, 77	
Steamship Company, Transatlan-	133	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire engine	205, 307	
Steel made from the ore	178	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire escape	173, 221, 236(2)	
Steel, manufacturing cast	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire extinguisher 13, 125(2), 187, 237, 321		
Steel, new test for	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire kindler	28, 76, 109, 251, 321	
Steel used in St. Louis bridge	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire plug	77	
Steering apparatus, semaphore	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire-proof compound	361	
Straw board, manufacturing	226	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fire-proof structure	10	
Street dust laid by chemicals	191	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fires	366	
Strike at Troy iron works	184	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Firearm, breech-loading 50, 78, 140, 141, 155, 158(2), 381, 382, 396		
Submarine engineering	213	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Firearm, double barreled	309	
Submarine exploration	105, 132	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Firearm, magazine	268, 306, 402	
Submarine perambulation	105, 132	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Firearm, piston, etc.	268	
Subscribers, our	49, 68	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Firearm, revolving	222	
Suez canal	230	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fireman's ladder	62	
Sugar business	331	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fireplace	109, 125, 171, 284, 323	
Sugar, consumption of	331	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fish and potato, desiccated	347	
Sugars, bleaching and granulating	104	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fish bait cutter	253	
Salpater in the arts	326	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fish, conveying live	404	
Salpater	326	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fish, desiccating	404	
Sanitary	326	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fish, etc., preserving	378	
San, power, etc.	326	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fishhook	45	
San, protuberances, etc.	326	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fishing tackle	92, 226, 251, 317, 323, 325	
San, rays—why they healthy	301	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fistula instrument	404	
Sandstone, chemistry of	104	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fistula or bottle	140	
Supersaturation, phenomena of	323	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Flooring cradle	159	
Suspension bridge, proposed East	90	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Flood gate	159	
Sweet potatoes, desiccated	213	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor clamp	31, 173, 189, 267	
Sweetmeats, green color for	145	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor covering	61, 223, 308	
Swindling patent agents	73	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor ball	45, 153, 190	
T		Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor cooler	405	
Tact, what is	249	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor dispenser	189	
Taste and smell utilized	122	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor dredge	189	
Tax plates in photography	10	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor miter	44	
Tea trade in New York	387	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Floor packer	29	
Teaching by machinery	145	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Flower frame	28	
Teeth in gears, to find number of	163	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Flower pot	206	
Telegraph, Cook	194	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Flower-preserving case	382	
Telegraph in Philadelphia	194	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fluid elevator	382	
Telegraph, learning to	97	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fluid meter	14, 295	
Telegraphs, military	40	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fluted trimming	307	
Telegraphic communication, rapid	276	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fluting machine	348, 404	
Telegraphing without wires	151	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly brush, automatic	171	
Telegraphy, modern	276	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly frame flyer	126	
Telescope, lecture on the	408	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly net	93, 155	
Thermometers, selecting	291	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly strap puncher	404	
Things a mechanic should know	157	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly trap	404	
Things easy and difficult	217	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59, 173, 187, 265	Fly wheel	44	
Thought and expression	149	Ash after	11, 12, 111, 323	Culinary vessel	59, 173, 187, 265	Culinary vessel	59,			

Advertisements.

The value of the SCIENTIFIC AMERICAN as an advertising medium cannot be over-estimated. Its circulation is ten 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. 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 advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth \$2.50 per line to advertise in one of thirty thousand.

RATES OF ADVERTISING.

Back Page.....\$1.00 a line.
Inside Page......75 cents a line.
Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATENT RIGHTS SOLD ON COMMISSION by STREET, WEBSTER & CO., Atwater Building, Cleveland, O. Best of references given. 26 6

FOR SALE TO First Applicant—A Complete set of Patent Office Reports, since 1841, in 38 vols., for \$50. Address Postoffice box 218, New York. 26 4

FIRST-CLASS Machinists' Tools, Steam Engines, Heavy Machinery, Shafting, Pulleys, etc. Manufactured by TWISS, PRATT, & HAYES, New Haven, Ct. 26 4

WANTED—Salesmen to Travel for a Manufacturing Co., and sell by sample. Good wages are guaranteed. Address, with stamp, H. D. HAMILTON, & Co., No. 418 Chestnut st., Philadelphia, Pa. 26 4

TO FOUNDERMEN—No. 4, Mackenzie Blower for sale, but little used. Price \$275. Also, one 12-inch Coil Heater, new, \$60. L. E. OSBORN, New Haven, Ct. 26 3

1ST PREMIUM PORTABLE STEAM ENGINES—4 to 15 Horse Power. Send for circular. J. S. CHAMBERLAIN & CO., Factory 2 and 4 Sussex st., Jersey City. Office 214 Pearl st., New York. 26 3

GUARANTEED—5000 feet of inch Boards ripped by one man and boy, in ten hours, with Talpoy's patent Self-feeding Hand Saw Mills. W. H. HOAG, Manufacturer. Postoffice box 4243, 214 Pearl st., N. Y. Agents wanted. 26 4

M. J. D. THOMPSON, LATE PRESIDENT of the Central National Bank, of Cincinnati, Ohio, becomes a member of our firm from this date—Dec. 10, 1898. E. E. ROBERTS & CO., Financial Agents, 15 Wall st., N. Y. 26 1

NEW AND IMPROVED BOLT CUTTER—Schlenker's Patent.—The Best in use. Cutting Square, Coach Screw and V-Thread by once passing over the iron. Cutter Heads can be attached to other Machines, or the ordinary Lathe. Taps furnished to order. Circular price list, with references mailed on application. Circular price list, with references mailed on application. 26 3

THE GREATEST INVENTION OF THE AGE—Butter made in from 3 to 5 minutes by the use of our infallible Butter Powder, at a cost of 20 cents a pound—simple in operation, harmless in use. Sent free to any address on receipt of price \$1. Full directions. Agents wanted in every Town and County. Address GOSHEN BUTTER CO., No. 102 Nassau st., New York. 26 4

Excelsior Lubricator. PATENTED AUG. 25th, 1868.—For Cylinders of Engines. A very superior and Durable article manufactured by B. E. LEHMAN, Lehigh Valley Brass Works, Bethlehem, Pa. Descriptive circular and price list sent on application. 26 1

Agents Wanted. \$75 Or a Commission from which twice that amount can be made by selling the latest improved Common Sense Family Sewing Machine. Price \$18. For circulars & terms address C. BOWERS & CO., 320 S. 3d st., Philadelphia, Pa. 26 13

IRIDIOSCOPE—A New Optical Instrument which shows the inside of the eye. It detects foreign substances & locates diseases. By mail \$1. F. SYLVESTER, 32 Ferry st., Pittsburgh, Pa. 26 1

BOYS' FUN—7000 Sold.—Hunting and Trapping.—THE HUNTER'S GUIDE AND TRAP-PEER'S COMPANION. A Book for Farmers, Hunters, Trappers and Boys. Tells how to hunt and trap all kinds of game, from the mink to the bear and deer; how to cure skins, make traps, etc. Fifth edition, just out, the only cheap and reliable work ever printed. Price only 25c. 6 for \$1; 10 for \$1.50. Sent, post free, by HUNTER & CO. Publishers, Hinesdale, N. H. 26 3

THE NOVELTY IRON WORKS, Foot East 12th Street, BRANCH OFFICE, No. 77 and 83 Liberty Street, New York. MANUFACTURE Every description of machinery. Also, IRON WORK for BUILDINGS, BRIDGES, etc. 26 1

U. S. PATENT OFFICE Washington, D. C., Dec. 5, 1898. J. J. Anderson, of Rochester, New York, Pa., having petitioned for the extension of the patent granted him on the 5th day of March, 1885, for an improvement in "Cook Stoves," it is ordered that said petition be heard at this office on the 15th day of February next. Any person who opposes this extension, Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing. ELISHA FOOTE, Commissioner of Patents. 26 1

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 34 and 36 Green St., New York. Worcester, Mass. Warehouse, 89 Liberty Street, N. Y. 10 15 11 WITHERBY BROS. & CHARLES

STATE AND COUNTY RIGHTS FOR sale, for J. H. B. Wisheart's Improved Grain Screen. Over \$1,000 worth of territory and machines sold in one week. Agents wanted. For further information address, with stamp, J. H. B. WISEHEART, III Shawneetown, Ill. 22 4

Radial Drills AND Machinists' Tools. For Cut and description of Driven Scientific American, Vol. XIX, No. 25. E. B. BARR & CO., Wilmington, Del. 25 13

\$10 A Day for all. Stencil tool, samples free. Address A. J. FULLAM, Springfield, Vt. 21 13

BURNERS FOR KEROSENE LAMPS. The American Institute have instituted an investigation to endeavor to ascertain the best and safest Lamp Burner for using the products of Petroleum, and also to investigate the merits of all other apparatus for using the products of Petroleum for illuminating purposes. Inventors, and all others interested, are respectfully requested to send any burner or other apparatus they may wish to test to JOHN W. CHAMBERS, the clerk of the American Institute, Room No. 22, Cooper Building, New York. 36 1

Tool Chests FOR HOLIDAY PRESENTS. All sizes, for MEN, YOUTH, and BOYS, from \$2 to \$50 each. Circulars sent on application to A. J. WILKINSON & CO., 26 2 Boston.

WATCHES.—\$500. I Will Cheerfully Give the above amount to any one who can surpass my imitation of Gold Watches. Description of metal and goods sent free on demand. Prices from \$16 to \$22. They are sent, C.O.D., with charges. Address JULES D. H. VUILLEMIN, No. 44 Nassau st., New York. 26 1

VAN NOSTRAND'S ECLECTIC ENGINEERING MAGAZINE. 96 Pages, Large 8vo Monthly. FIRST NUMBER TO BE ISSUED JANUARY 1, 1899. Price \$5 a year, in advance; single copies 50c.

VAN NOSTRAND'S MAGAZINE will consist of Articles Selected and Matter Condensed from all the Engineering Serial Publications of Europe and America.

This will be done under the direction of Mr. A. L. HOLLEY, the well-known Author and Constructor in various branches of Engineering.

The object of this Magazine is to present, within limits of space and cost that all can afford, the cream of not less than fifty engineering, mechanical, chemical, and metallurgical publications. The French and German Magazines will be largely translated. Papers and Discussions before Societies will be condensed. Professional news from all sources will be compiled at length.

D. VAN NOSTRAND, Publisher and Importer, 192 Broadway, New York.

Our New Catalogue of American and Foreign Scientific Books 56 pages, 8vo, sent to any address on receipt of six cents in stamps.

Star Spangled Banner ENLARGED AND IMPROVED. EIGHT large pages and forty long columns, all for 75c. a year, and a splendid 12x18 inch engraving, mounted on roller, free to every subscriber. Thousands subscribing weekly. Now is the time, if you would secure all the numbers. January number now ready, only five cents. Read the partial list of contents. Only 75 cents secures splendid \$2 engraving and paper a year.

Contents: Solving the Ghost Question; The Everlasting Talker; The Goddess of Slang; One Puzzle Box; Enigmas, Riddles, Conundrums, &c.; Three Jealous Husband's; Pen and Scissors; Sleep; Spoiled His Coat; Givest the Water a Chance; Beer Not Intoxicating; Lessons in Geography; Thirty; Scintillations; Poetry; "Old Times"; Somebody's Heart; Chicago; The Spreading Rumor; That Golden Tress of Hair; Selling a Brig; Her Own Gail; "Sold for Ten Dollars"; Prestidigitation; Ventriloquism; Card Tricks; Things Worth Knowing; A Crowd; Advice to a Young Man; Our Chip Basket; One Hundred Funny Things; Editorial; "Happy New Year"; Business; Literary Notices; "What Paper Shall I Take?" Correspondence; Publishers' Notices; Humorous Exposed; Dollars Sales; Consumption Cured; "How They Do It"; this chapter alone worth a year's subscription. Remember all the above articles and a hundred short ones, are all in the "Star Spangled Banner" for January, NOW READY—5 cents, mailed for 6 cents. Buy it at any news dealer's or subscribe. Only 75 cents for the paper a whole year, and the splendid \$2 engraving "Evangeline." Now is the time. One copy 75 cents; three for \$2; five for \$3.25; ten for \$6.25; twenty for \$12. Splendid premium free to every subscriber. Send name and address to STAR SPANGLED BANNER, Hinesdale, N. H. 26 1

TO OWNERS OF STEAM BOILERS. Paige's Lock-Up Safety Valve, approved by inspectors and equal to any in market. Call and examine. C. W. COPELAND, No. 171 Broadway, N. Y. 22 4

Leather Belting, Card Clothing, & Hose Factory. J. H. HASKELL, Baltimore, Md. 23 26

BENT, GOODNOW & CO., Boston, Mass., Agents for the sale of Patents. FOR SALE—A variety of valuable Patents. Send stamp for THE PATENT STAR. 22 1

OIL! OIL!! OIL!!! FIRST PREMIUM.....PARIS, 1867 Grand Silver Medal and Diploma! WORLD'S FAIR—London, 1862. TWO PRIZE MEDALS AWARDED

PEASE'S IMPROVED OILS! Engine, Signal, Lard, and Premium Petroleum is the Best Made for Railroads, Steamers, and for Machinery and Burning. F. S. PEASE, Oil Manufacturer, Nos. 61 and 63 Main street, Buffalo, N. Y. N. B.—Reliable orders filled for any part of the world. 21 1

WANTED—An Agent in each town to take the agency for the sale of Bradstreet's Rabbit-Molding and Weather-Strips, applied to the side, bottom, top, and center of doors and windows. The sale is beyond anything ever offered to an agent. From \$10 to \$25 per day can be made. Send for agent's circular. The first who apply secure the agency. J. R. BRADSTREET & CO., Boston, Mass. 19 2

IMPORTANT.

THE MOST VALUABLE MACHINE for planing irregular and straight work, in all branches of wood working, is the Combination, Molding and Planing Machine. Our improved guards make it safe to operate. Our combination collars save one hundred per cent, and for planing, molding, and cutting irregular forms, our machine is unsurpassed.

The Variety Machine and other Patents owned by us, and the public will please notice the deeds given by Mr. Gear cover only the Gear Patent, being no patent, infringement on which we are now prosecuting.

The Gear Patent, without our improvement, has for many years been discarded by mechanics as impracticable. In fact we have had on hand, ever since the introduction of our improvements, several of the old Gear Machines, which we cannot sell even at prices slightly above the value of old iron.

All our machines are sold and delivered in New York, but the right to use a machine goes with it, and we will protect all parties who may purchase machines from us, not only under the Grosvener and Tice Patents, which constitute the practical value of the machine, but also under the Gear Patent.

Attention is called to cuts of our Variety Machine (in issue of this journal of December 9th, 1898, of which we are the sole and exclusive agents) and other parties building, or vending like machines, are given notice, with the slightest legal authority, subjecting themselves and patrons to heavy damages, the collection of which we are determined to prosecute to the fullest extent of the law. All parties who desire to avoid legal trouble, and to secure the best of the Grosvener and Tice Patents, should be addressed to COMBINATION MOLDING AND PLANING MACHINE CO., 421 East 23d st., or Box 8250, Post Office, New York City.

MORE IMPORTANT.

DON'T BE DECEIVED IN BUYING VARIETY MOLDING AND UPRIGHT SHAPING MACHINES, THE FOUNDATION, SOUL, AND BODY OF WHICH IS THE GEAR PATENT. The Combination Molding and Planing Machine Co., own the GEAR PATENT for the state of N. Y., and a small interest in the state of Massachusetts. A. S. & J. GEAR & CO. ARE LAWFUL OWNERS AND MANUFACTURERS FOR ALL THE UNITED STATES, except the state of N. Y. We give a DEED, an absolute transfer, of a portion of the patent of nature to use every machine sold, to protect the public from imposition, and caution the public against purchasing of anybody else who dare not give a deed of right to use the "Gear Patent" portion of the foundation of their machines to be used where they do not own the territory.

We shall furnish Deeds of Right to Use our Improvements whenever it becomes necessary to do so to protect innocent purchasers from being swindled. Notice particularly their stated words: "All our Machines are sold and delivered in New York. Nobody disputes their right to 'sell' and 'deliver' in New York, but why do they refuse to give Deeds, the only guarantee, to use them out of the State of New York? If vested with a title, why refuse to give a title?"

INSIST UPON HAVING A DEED OF RIGHT TO USE THE GEAR PATENT of their machines. They never built one of their machines without using the Gear Patent as a foundation. Not one machine in fifty in use, are now used, with either of the two patents spoken of. Human beings, in an attempt to fly, would make no worse a failure, than the whole race would make in attempting to make a Machine such as represented, built and sold by them, out of the Grosvener and Tice patents spoken of, without infringing on the Gear Patent. They were once considered improvements, by some, on the Gear Patent, and both are superseded now by new improvements, the inventions of Mr. J. P. Tice, the same inventor of the principal one of them, and are now lawfully made only by us. Mr. Hamilton, the advertising man of the C. M. & P. M. Co., wrote us, under date of March 5, 1898, that he was satisfied our improvements were not infringements on the Gear Patent. He also wrote Mr. N. Gear, about the time Mr. Grosvener got out his improvements, that they were not worth anything, and Stoughton (a patent lawyer) said that they were a perfect infringement on Mr. Gear's. We think it useless to contradict this man's statement further. The letters we have in our possession.

KEEP OUT OF TROUBLE. In the description of engravings of the C. M. & P. M. Co.'s Machine in this paper, Dec. 9th, the manner of holding the cutters or knives and the bearings are guided (which the combined talent of the world during the past fifteen years have failed to supersede or even equal), which are two of the essential features of the "Gear Patent" are omitted. Query: Why?

EXAMINE YOUR RAIT BEFORE BITING. If you want a machine to use in New York State, purchase of them. If you want one to use elsewhere purchase of us. Our machines, intermediate Adjustable collars for combination cutters, D. Jordan's Patent Adjustable Guards, making ours safe to operate, Feed Table, and Hoisting apparatus, ARE IMPROVEMENTS ON THEIRS and are WARRANTED.

For pamphlets of particulars and machines, address A. S. & J. GEAR & CO., NEW HAVEN, CT., and Concord, N. H. Branch Office, 83 John street, N. Y.

ROBERT MCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS. 15 13 622 Cherry st., Philadelphia, Pa.

R. BALL & CO., Worcester, Mass., Manufacturers of the latest improved patent Daniels', Woodworth's, and Gray & Wood's Planers, Sash Molding, Tenoning, Power and Foot Moulding, Upright and Vertical Shaping and Boring Machines, Scroll Saws, Double Saw Bench, Re-Sawing, and a variety of other machines for working wood. Also, the best Patent Hub and Rail-car Moulding Machines in the world. Send for our illustrated catalogue. 12 11

Bridenburg Manf'g Co., Office No. 65 North Front Street, PHILADELPHIA, PA. Manufacture all kinds of Cotton and Woolen Machinery including their new

Self-Acting Mules and Looms. Of the most approved style. Plans drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order. 22 11

WROUGHT IRON Beams and Girders. THE Union Iron Mills, Pittsburgh, Pa. The attention of Engineers and Architects is called to our improved Wrought Iron Beams and Girders, (patented), in which the compound welds between the ends and flanges, which have proved so objectionable in the old mode of manufacturing, are entirely avoided, we are prepared to furnish all sizes at terms as favorable as can be obtained elsewhere. For descriptive lithograph address the Union Iron Mills, Pittsburgh, Pa. 30 13

Lucius W. Pond, IRON and Wood working Machinery, Machinists' Tools and supplies, Shafting, Mill Gearing, and Jobbing. At o. Sole Manufacturer of TAIT'S CELEBRATED PUNCHES & SHEARS, (Works at Worcester, Mass.) 98 Liberty st., New York. 14 11

Sheet and Roll Brass, BRASS AND COPPER WIRE, German Silver, etc., Manufactured by the THOMAS MANUFACTURING CO., Thomaston, Conn. Special attention to particular sizes and widths for Type Foundries, Machinists, etc. 22 26

AZURENE CONCENTRATED INDIGO For the Laundry—Free from Oxalic Acid.—See Chemist's Certificate. A Patent Pocket Pincushion or Emery Bag For Sale by all respectable Grocers and Druggists. 14 18

A BOOK THAT EVERYBODY SHOULD HAVE.

WELLS' EVERY MAN HIS OWN LAWYER, AND BUSINESS FORM BOOK. Is a complete and reliable guide in all matters of law and business transactions for EVERY STATE IN THE UNION.

THE ENTIRE LEADING PRESS OF THE COUNTRY unqualifiedly indorse the work. We make a few short extracts from the press:

"As a legal adviser, always at hand to instruct the reader how to proceed in suits and business transactions of every kind, as a form book to enable the least learned to draw up deeds, mortgages, agreements, leases, orders, wills, etc., as a guide with regard to the laws of the various States concerning exemptions, liens, limitation of actions, collection of debts, jury, and so on, this volume is certainly invaluable to men of business, and it is not surprising that a hundred thousand copies have so soon found their way into the homes and country houses of the multitude. In addition, the work contains a full digest of the action of the Government relative to reconstruction and the freedmen, the General Bankruptcy Law, the Patent Laws, Pension Laws, the Homestead Laws, the Internal Revenue Laws, etc. The publisher has determined to make this work complete, and to our thinking, he has succeeded. No business man or woman can with safety be without it."—New York Times

"This work is one of the most valuable issues of the press of this country. It contains so much that every man in business should know but which none have the time to acquire from voluminous works, that it is truly indispensable."—New York Dispatch

"Such a useful book cannot be too highly commended. A more comprehensive digest could not be desired."—New York Weekly Tribune

"There should be a copy of it in every family."—New York Weekly

"The most implicit confidence can be placed upon the work as authority on all the subjects of which it treats."—Phil. Triphila Age

"You can purchase in this book what may be worth hundreds of dollars to you."—St. Louis Dispatch

"It contains just the kind of information every business man stands most in need of."—Savannah Mercury

"Every man who has what his business may be should have a copy."—Pittsburgh Dispatch

"There is no better book of reference."—Phenological Journal

"The book is prepared to meet all the ordinary contingencies of business life, and it meets them clearly, distinctly and well."—Round Table

"It contains a vast amount of just such matter as every one ought to be acquainted with in the prosecution of all ordinary business."—N. Y. Christian Advocate

"It is the best business guide ever published."—De Bow Journal, St. Louis

"Every one should have a copy."—N. Y. Eve. Post

"It is invaluable."—Cincinnati Enquirer

"Indispensable to every household."—Cincinnati Commercial

"This work is worthy of the popularity it has acquired as a convenient and reliable manual."—N. Y. Herald

The work is published 12mo size, 656 pages. Price in full leather binding \$2.50, in half leather \$2. Sent post paid on receipt of price.

Good reliable agents wanted everywhere. They will find this the best selling book published. Liberal inducements given. Address JOHN G. WELLS, Publisher, 42 Broome street, New York.

Leroux on Worsted AND CARDED YARNS. JUST PUBLISHED.—A Practical Treatise on the Manufacture of Worsted and Carded Yarns: Comprising practical mechanics, with rules and calculations applied to spinning; sorting, cleaning, and scouring wools; the English and French methods of Combing, drawing, and spinning worsteds and manufacturing carded yarns. Translated from the French of Charles Leroux, Mechanical Engineer and Superintendent of a Spinning Mill, by Horatio Paine, M.D., and A. A. Esquet, Chemist and Engineer. Illustrated by twelve large plates. To which is added an Appendix, containing extracts from the reports of the international jury, and of the artisans selected by the committee appointed by the Council of the Society of Arts, London, on woolen and worsted machinery and fabrics exhibited in the Paris Universal Exposition, 1867. In one vol., 8vo, muslin. Price \$5. By mail free of postage.

The subscriber takes great pleasure in announcing the publication of this thorough, systematic, and valuable work on the Manufacture of Worsted and Carded Yarns.

His experience as a publisher of Industrial Books during a period of nineteen years, has given him abundant proof that such a book is among the greatest and most pressing wants of American industry; and he is well convinced that the rapid sale of this edition now printed will fully justify him in that conviction.

This treatise is the production of a writer who is entirely conversant with the practice of his art. It has been carefully and faithfully translated, and the very full table of contents is herewith presented as giving a most correct idea of the range of the volume.

ALSO, The Art of Dyeing, Cleaning, Scouring, and Finishing on the most approved English and French Methods; being Practical Instructions for Dyeing Silks, Woolens, and Cottons, Feathers, Chaps, Straws, etc. Scouring an Cleaning Bed and Window Curtains, Carpets, Rugs, etc. French and English Cleaning for any Color or—sorts of Silk, Satin, or Damask. By Thomas Love, a Working Dyer and Scourer. Second American Edition, to which are added several instructions for the use of Aniline Colors. In one vol. 8vo, 355 pages. Price \$5.

The above or any of my Practical and Scientific Books sent by mail free of postage. Cotton, Woolen, and Worsted Manufacturers and Dyers, are particularly invited to send for my New Special Circulars of Books on these subjects just ready.

HENRY CAREY BAIRD, Industrial Publisher, 406 Walnut street Philadelphia. RUST'S Boiler-Plate Hand Punches, price reduced. S. C. HILLS, 12 Platt st., New York. 30 26

THE Best Small Lathe Dog in the world. Carries from 1/4 to 1 inch. Price \$1. Address AMERICAN TWIST DRILL CO., Woonsocket, R. I. 29 11

Machine-made Watches By the TREMONT WATCH COMPANY, BOSTON, MASS. The Cheapest Reliable Watch. Their Watches are dust proof, and all have their best Chronometer Balance. For sale by all respectable dealers. 10 13

MERRICK & SONS, Southwark Foundry, No. 430 Washington Avenue, Philadelphia. William Wright's Patent VARIABLE CUT-OFF STEAM ENGINE, Regulated by the Governor. Merrick's SAFETY HOISTING MACHINE, Patented June, 1888. DAVID JOY'S PATENT VALVELESS STEAM HAMMER, D. M. Weston's Patent Self-Centering, Self-Balancing Centrifugal Sugar-Draining Machine, AND HYDRO EXTRACTOR For Cotton and Woolen Manufacturers. New York Office, 62 Broadway. 10 26

HICKS' Improved CUT-OFF ENGINE, AND Non-Explosive Circulating Boiler Cannot be equalled for correctness of principle, economy in operation, perfect workmanship, and cheapness of price. W. C. HICKS, 35 Liberty st., New York. 21 1

WOODWORTH PLANERS—IRON Frames 18 to 34 inches wide. \$125 to \$150. S. C. HILLS, 12 Platt st., New York. 21 1

Advertisements.

Advertisements will be admitted on this page at the rate of \$1 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 150*

THE PEW HAT RACK.—For Circular, address E. S. BLAKE, Pittsburgh, Pa. 36 40*

FOR SALE.—Weyman & Meyer's Stove Foundry, Tell City, Ind. Address WEYMAN & MEYER. 108*

TWO-SET KNITTING MILL FOR SALE, situated in the Eastern part of the State of New York, a good location, with never-failing supply of water. Power ample for four sets. Mill and Machinery nearly new, all in good order, and now in successful operation. Eighteen acres of land, fine residence, with outbuildings, tenements, etc. Will be sold at a bargain and on the most accommodating terms. Possession immediately. For full particulars address 36 40* MANUFACTURER, Box 117 Albany, N. Y.

100 MECHANICS WANTED TO SELL HOW TO MAKE THE FARM PAY. A Work wanted by every Farmer, Stock Raiser, Horse Owner, Fruit Cultivator, and Gardener, and by every Family in the land. Mechanics, Farmers, and others are offered permanent employment, or employment for the winter only, as may be desired. Commissions \$100 to \$250 per month, according to ability and energy. Send for Circulars giving full description. Address: ZIEGLER, MCKINLEY & CO., Philadelphia, Pa., Cincinnati, O., Chicago, Ill., St. Louis, Mo. 108*

The New American CORNET AND BAND INSTRUMENTS.

LOUIS SCHREIBER'S Patent, with Water valves. The sweetest toned, most powerful, and easiest to play, the very best. They are novel in form, in action, and in the make of the valves. Wherever tried they are pronounced the most perfect instruments ever made. We allow ourselves to make the most severe tests before accepting the instruments, and in NO CASE has a set of instruments so tested been returned. We have sent sets to Canada, to all the Western States and Territories, this side of the Rocky Mountains, and in EVERY INSTANCE were cheered by the highest commendation. For price lists, etc., address: M. J. PALLARD & CO., 21 Maiden Lane, N. Y. 25 05

KIDDER'S PASTILLES—A Sure Relief 107 Asthma. STOWELL & CO., Charlestown, Mass. 21 05*

INCREASE TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's gauge, and Beach's Patent Self-Centering Chuck manufactured by Morse Twist Drill and Machine Co., New Bedford, Mass. 9 05*

CARVALHO'S IMPROVED STEAM SUPERHEATER.—Saves Fuel, supplies Dry Steam, invaluable for Boiling, Heating, Drying, etc., or for Power. Safe, Durable, and Easily Attached. HENRY W. BULKLEY, Engineer, 70 Broadway, New York. 25 05*

FREE. Our New Catalogue of Improved STENCIL DISS. More than \$200 A MONTH is being made with them. S. M. SPENCER & CO., Watboro, Vt. 11 05

WIRE ROPE.

Manufactured by JOHN A. ROEBLING

FOR Inclined Planes, Standing Ship Riggers, Bridges, Ferris, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 14 15* or 11

PATENT SOLID EMERY WHEELS specially adapted to grinding saws, mills, and edge tools. Solid Wheels for Brass Work, warranted not to glaze. Also, Patent Emery Oil and Slip Stones, the best article in use for planer knives, Carvers' tools, and for finishing down iron work. NORTHAMPTON EMERY WHEEL CO. Leeds, Mass. 21 11 or 05

DO YOU WANT GAS

WE can afford to pipe your house, or pay for your fixtures, or both, and leave them as your property if we cannot put up a Machine that shall be perfectly satisfactory under any and every condition. Circulars and information. UNION GAS CO., 14 Deyst., New York. 1 05 or 11

London, 48 Cannon street. H. KOHNSTAMM, Manufacturer of

ULTRAMARINE, And importer of English, French, and German Colors, Paints, and Artists' materials, Bronzes and Metals, No. 3 Tryon Row, New York, opposite City Hall. 19 150*

FOR Shafting, Hangers, and PULLEYS, apply to STURGES WHITELOCK, Birmingham, Conn. Self-Adjusting Hangers, with self-closing boxes. 24 05 or 11

WATER WHEELS. THE Duplex Turbine, NOT Equaled by any wheel in existence. Great economy of water. The only wheel suitable to variable streams. Manufactured by J. E. STEVENSON, 23 Liberty St., New York. 23 05 or 100

LE COUNT'S PATENT Hollow Lathe Dogs and Clamps.—A set of 8 dogs from 3/4 to 2 1/2 in. inclusive, \$8. A set of 12 from 3/4 to 4 in., \$17.50. Five sizes Machine Clamps, from 2 to 6 in. inclusive, \$11. Send for Circular. C. W. LECOUNT, South Norwalk, Conn. 18 11 or 100

IRON PLANERS, ENGINE LATHES, Drills, and other Machinery Tools, of Superior Quality, on hand and finishing. For Sale Low. For Descriptive Circulars and Price, address NEW HAVEN MANUFACTURING CO., New Haven 15 11 or 05

Foundry, Machine, Boiler and, BLACKSMITH SHOP FOR SALE.

THE Oldest Established Foundry and Machine Shop in the State, centrally located in New Haven, with a very large assortment of valuable patterns. Foundry 140 ft. by 40 ft., with addition 25 x 35, brick sand house; No. 2 and No. 3, McKenzle Cupolas, and No. 4 McKenzle Blower. One three-story brick Machine Shop, with attic, 100 x 50. One three-story brick Machine Shop, with attic, 70 x 50. Boiler Shop 80 ft. square. Blacksmith Shop 50 x 20. Engine House contains a 30 Horse Power Engine and 60 Horse Power Boiler. A good yard, well drained, brick barn, and convenient sheds make up the premises. The shops are all running full time, with a good run of work, employing about 150 men. The Tools and Machinery will be sold with the Real Estate, or separately, as desired. Price low, terms easy. Further particulars and satisfactory reasons for selling given by addressing BIGELOW MANUFACTURING CO., New Haven, Conn.

Valuable Machinery For Sale.

2 16-foot Planers. 1 18-foot Shafting Lathe, 24-in. swing. 1 10-foot Lathe, 30-inch swing. 1 10-foot do, 42-inch do. 20 6 and 8-foot Lathes, some nearly new, and all in good condition. 12 6 and 8-foot Lathes, new. 1 24-foot Lathe, 6-foot swing, nearly new (Wood, Light & Co.). 1 18-foot Lathe, 30-inch swing. 1 12-foot do, 24-inch do. 11 Upright Drills. 1 No. 2 Fowler Press. The above-described machinery must be sold, and will be sold cheap, in lots to suit purchasers. Address, BIGELOW MANUFACTURING CO., New Haven, Conn.

SUPERIOR RASP—For Clover Mills—At less than makers' cost. J. B. WEST, Geneseo, N. Y. 25 05*

EAGLE ANVILS, and PARALLEL CHAIN VISES.

Manufactured ONLY by FISHER & NORRIS, Trenton, N. J. (15 250*)

B.F. STURTEVANT'S NEW PATENT IMPROVED FAN PRESSURE BLOWERS MANUFACTORY & SALESROOM 72 SUDBURY ST. BOSTON.

OF ALL SIZES, for purposes where a blast is required. Send for particulars and circulars. 16 15 or 05

WOODWARD'S COUNTRY HOMES. 150 Designs, \$1.50, postpaid. GEO. E. WOODWARD, Architect, 191 Broadway, N. Y. Send stamp for catalogue of all new books on Architecture. 21 05 11

EMERSON'S PATENT MOVABLE TOOTHED CIRCULAR SAWS SUPERIOR TO ALL OTHERS FOR DESCRIPTIVE PAMPHLET ADDRESS THE AMERICAN SAW COMPANY, Factory, Trenton, N. J. Office, No. 22, Jacob St., N. Y. Branch Office for Pacific Coast, No. 606 Front St., San Francisco, Cal. 20 11

Reynolds' WATER WHEELS

No Complex, Duplex, or Triplex complications. All such are costly, perishable, easily clogged, inaccessible. Mill Gearing, Shafting and Pulleys. Send for Illustrated Pamphlet. GEORGE TALLCOT, 96 Liberty St., New York. 15 05 13*

THE Eclipse Steam Pump Overcomes the disadvantages of all others. It has the only balance valve made; can be moved as easily as 150 lbs; is simple, cheap, easily packed, and kept in order, and is unequalled for mining and other purposes. 20 13 PHILLIPS & CULEYS, Pittsburgh, Pa.

For Sale. THE United States Military Rolling Mill at Chattanooga, Tenn. For particulars apply at No. 17 Burling Slip, New York. ABBAM S. HEWITT, Treasurer. 25 2

FOR SALE.—One Improved Ore and Quartz Breaker; One Planer for edges of Boat and Boiler Plates. Will be offered very low. Also, Stationary Engines, Boilers, and Mill Machinery constantly making and for sale by DENMEAD & SON, Baltimore, Md. 25 4

\$60 Per month and large commissions paid to sell Wonder of the World and three other discoveries. Address J. C. Tilton, Pittsburgh, Pa. 25 4

MANGANESE AND Wolfram Ore, For Steel Manufacturers. For Sale by L. & J. W. FEUCHTWANGER, 25 4 55 Cedar St., New York.

FOOT LATHES AND TOOL CHESTS. ILLUSTRATED Circulars free to any address. GOODNOW & WIGHTMAN, 35 Cornhill, Boston. 25 4

VINEGAR FABRICATION.—Prof. H. Dussauce, Chemist, is ready to furnish the most recent methods to manufacture vinegar by the slow and quick processes. Address, New Lebanon, N. Y. 25 2*

\$500 Will Purchase the Exclusive Right of a valuable Patent. All information given by addressing E. L. BRIGHT, Patentee, Hibernia, N. Y. 25 2*

WOODBURY'S PATENT Planing and Matching and Molding Machines, Gray & Woods Planers, Self-feeding Planers, and other wood-working machinery. B. A. WOODS, 185 Liberty Street, N. Y. Send for Circulars 77 Sudbury Street, Boston. 25 13

POSITIVE STEAM PUMP.

No.	Gallons per Minute.	Price.
1	3	\$60.00
2	10	85.00
3	20	120.00
4	40	140.00

Send for Circular to J. W. COLE, 205 Broadway, N. Y. 25 108*

AGENTS WANTED TO Sell the Newest Best and Most Reliable Thing Out; only thing of the kind in the world. \$20 per week on \$5 Capital. Send for Circular. Address: MARCUS L. BYRN, 25 2 No. 80 Cedar St., New York. Postoffice box 4,609.

REGISTER'S Patent Gauge Cock.

Agents wanted in every County. Address, J. REGISTER & SONS, Baltimore, Md. 25 13

THE WHITLOCK EXPOSITION.—A Perpetual Fair in the City of New York, open for the Exhibition of New Inventions, and all articles of Manufacture, being the best method of advertising and showing articles ever devised. Exhibition free to the Public. See Scientific American, No. 24, or send for circulars to Whitlock Exposition, Publications, and Exchange Co., 245 Broadway, New York. 25 11

THE BEST MACHINISTS' TOOLS AND Gun Machinery in use are made by PRATT, WHITELEY & CO., Hartford, Conn., who now have ready for delivery, Engine Lathes, 15-in. swing, weighted and gibbed, with and without taper attachment, turn 3/4, 3/8, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384, 1/32768, 1/65536, 1/131072, 1/262144, 1/524288, 1/1048576, 1/2097152, 1/4194304, 1/8388608, 1/16777216, 1/33554432, 1/67108864, 1/134217728, 1/268435456, 1/536870912, 1/1073741824, 1/2147483648, 1/4294967296, 1/8589934592, 1/17179869184, 1/34359738368, 1/68719476736, 1/137438953472, 1/274877906944, 1/549755813888, 1/1099511627776, 1/2199023255552, 1/4398046511104, 1/8796093022208, 1/17592186044416, 1/35184372088832, 1/70368744177664, 1/140737488355328, 1/281474976710656, 1/562949953421312, 1/1125899906842624, 1/2251799813685248, 1/4503599627370496, 1/9007199254740992, 1/18014398509481984, 1/36028797018963968, 1/72057594037927936, 1/144115188075855872, 1/288230376151711744, 1/576460752303423488, 1/1152921504606846976, 1/2305843009213693952, 1/4611686018427387904, 1/9223372036854775808, 1/18446744073709551616, 1/36893488147419103232, 1/73786976294838206464, 1/147573952589676412928, 1/295147905179352825856, 1/590295810358705651712, 1/1180591620717411303424, 1/2361183241434822606848, 1/4722366482869645213696, 1/9444732965739290427392, 1/18889465931478580854784, 1/37778931862957161709568, 1/75557863725914323419136, 1/151115727451828646838272, 1/302231454903657293676544, 1/604462909807314587353088, 1/1208925819614629174706176, 1/2417851639229258349412352, 1/4835703278458516698824704, 1/9671406556917033397649408, 1/19342813113834066795298816, 1/38685626227668133590597632, 1/77371252455336267181195264, 1/154742504910672534362390528, 1/309485009821345068724781056, 1/618970019642690137449562112, 1/1237940039285380274899124224, 1/2475880078570760549798248448, 1/4951760157141521099596496896, 1/9903520314283042199192993792, 1/19807040628566084398385987584, 1/39614081257132168796771975168, 1/79228162514264337593543950336, 1/158456325028528675187087900672, 1/316912650057057350374175801344, 1/633825300114114700748351602688, 1/1267650600228229401496703205376, 1/2535301200456458802993406410752, 1/5070602400912917605986812821504, 1/10141204801825835211973625643008, 1/20282409603651670423947251286016, 1/40564819207303340847894502572032, 1/81129638414606681695789005144064, 1/162259276829213363391578010288128, 1/324518553658426726783156020576256, 1/649037107316853453566312041152512, 1/1298074214633706907132624082305024, 1/2596148429267413814265248164610048, 1/5192296858534827628530496329220096, 1/10384593717069655257060992658440192, 1/20769187434139310514121985316880384, 1/41538374868278621028243970633760768, 1/83076749736557242056487941267521536, 1/166153499473114484112975882535043072, 1/332306998946228968225951765070086144, 1/664613997892457936451903530140172288, 1/1329227995784915872903807060280344576, 1/2658455991569831745807614120560689152, 1/5316911983139663491615228241121378304, 1/10633823966279326983230456482242756608, 1/21267647932558653966460912964485513216, 1/42535295865117307932921825928971026432, 1/85070591730234615865843651857942052864, 1/170141183460469231731687303715884105728, 1/340282366920938463463374607431768211456, 1/680564733841876926926749214863536422912, 1/1361129467683753853853498429727072845824, 1/2722258935367507707706996859454145691648, 1/5444517870735015415413993718908291383296, 1/10889035741470030830827987437816582766592, 1/21778071482940061661655974875633165533184, 1/43556142965880123323311949751266331066368, 1/87112285931760246646623899502532662132736, 1/174224571863520493293247799005065244265472, 1/348449143727040986586495598010130488530944, 1/696898287454081973172991196020260977061888, 1/1393796574908163946345982392040521954123776, 1/2787593149816327892691964784081043908247552, 1/5575186299632655785383929568162087816495104, 1/11150372599265311570767859136324173632990208, 1/22300745198530623141535718272648347265980416, 1/44601490397061246283071436545296694531960832, 1/89202980794122492566142873090593389063921664, 1/178405961588244985132285746181186778127843328, 1/356811923176489970264571492362373556255686656, 1/713623846352979940529142984724747112511373312, 1/1427247692705959881058285969449494225022746624, 1/2854495385411919762116571938898988450045493248, 1/5708990770823839524233143877797976900090986496, 1/11417981541647679048466287755595953800181972992, 1/22835963083295358096932575511191907600363945984, 1/45671926166590716193865151022383815200727891968, 1/91343852333181432387730302044767630401455783936, 1/182687704666362864775460604089535260802911567872, 1/365375409332725729550921208179070521605823135744, 1/730750818665451459101842416358141043211646271488, 1/1461501637330902918203684832716282086423292542976, 1/2923003274661805836407369665432564172846585085952, 1/5846006549323611672814739330865128345693170171904, 1/11692013098647223345629478661730256691386340343808, 1/23384026197294446691258957323460513382772680687616, 1/46768052394588893382517914646921026765545361375232, 1/93536104789177786765035829293842053531090722750464, 1/187072209578355573530071658587684107062181445500928, 1/374144419156711147060143317175368214124362891001856, 1/748288838313422294120286634350736428248725782003712, 1/1496577676626844588240573268701472856497451564007424, 1/2993155353253689176481146537402945712994903128014848, 1/5986310706507378352962293074805891425989806256029696, 1/11972621413014756705924586149611782851979612512059392, 1/23945242826029513411849172299223565703959225024118784, 1/47890485652059026823698344598447131407918450048237568, 1/95780971304118053647396689196894262815836900096475136, 1/191561942608236107294793378393788525631673800192950272, 1/383123885216472214589586756787577051263347600385900544, 1/766247770432944429179173513575154102526695200771801088, 1/1532495540865888858358347027150308205053390401543602176, 1/3064991081731777716716694054300616410106780803087204352, 1/6129982163463555433433388108601232820213561606174408704, 1/1225996432692711086686677621720246564042712321234881408, 1/2451992865385422173373355243440493128085424642469762816, 1/4903985730770844346746710486880986256170849284939525632, 1/9807971461541688693493420973761972512341698569879051264, 1/19615942922883377386986841947523945024683397139758122528, 1/39231885845766754773973683895047890049366794279516245056, 1/78463771691533509547947367790095780098733588559032490112, 1/156927543383067019095894735580191560197467177118064980224, 1/313855086766134038191789471160383120394934354236129960448, 1/627710173532268076383578942320766240789868708472259920896, 1/1255420347064536152767157884641532481579737416944519841792, 1/2510840694129072305534315769283064963159474833889039683584, 1/5021681388258144611068631538566129926318949667778079367168, 1/10043362776516289222137263077132259532637899335556158734336, 1/20086725553032578444274526154264519065275798671112317468672, 1/40173451106065156888549052308529038130551597342224634937344, 1/80346902212130313777098104617058076261103194684449269874688, 1/160693804424260627554196209234116152522206389368898539549376, 1/321387608848521255108392418468232305044412778737797079098752, 1/642775217697042510216784836936464610088825557475594158197504, 1/1285550435394085020433569673872929220177651114951188316395008, 1/2571100870788170040867139347745858