Business and Lersonal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue. The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekiy issue.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

Machinist's Tools, Steam Pumps, Centrifugal Pumps, Iron and Woodworking Machinery, Engines, Boilers, and Supplies. O. L. Packard, 87, W. Water street, Milwaukee, Wis.

Wanted-Machine Shop to make Engines, in quantities, by contract. E. E. Roberts, 107 Liberty St., N. Y. Solid and Opening Die Bolt Cutters, Screw Plates, and Taps. The Pratt & Whitney Co., Hartford, Conn.

The genuine Asbestos Roofing is the only reliable substitute for tin; it costs only about one half as much, is fully as durable, is fireproof, and can be easily applied by any one. H. W. Johns Manufacturing Co., 87 Maiden Lane, New York, are sole manufacturers.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10.000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

For Sale.-Two Windmill Patents, and set of patterns for same. None better. F. C. Maxwell, Columbus, O. For Sale.—Flexible Lumber Patent for Cylinder Lag-

gings. Geo. C. Setchell, Norwich, Conn. Wanted .- Second-hand Magic Lantern Slides. Give quantity, quality, size, and price. Address Lantern, Baltimore, Md.

Wanted .- Particulars and Proposition for Ice Machine. Box 170, Charleston, Kanawha, Co., W. Va.

For Sale Cheap.—The entire patent for best Egg Beater ever put on the market. See illustration in Sci-ENTIFIC AMERICAN of February 21, 1880. Address H. C. Mann, Frankford, Pa.

Wanted-Circulars, with prices, from Manufacturers of Small Drop Hammers, that will strike one or more blows and then stop, and always up, with adjustment for heft of blow, and that will give from one to two hundred blows a minute. Must be open on one side for large work. Address Willcox, Treadway & Co., Cleveland, O.

Steam Engines, Boilers, Portable Railroad Sugar Mills. Atlantic Steam Engine Works, Brooklyn, N. Y.

For Sale.-Four Boilers, 100 horse power each, return drop flue: A 1 condition; \$1,500 each. 1 Berryman Heater, 42 x 96; A 1 condition; \$400. D. L. Einstein, 16 White St., New York.

For Iron Gas Pipe, see adv. on inside page.

Vertical and Steam Yacht Engines. T. B. Pemberton, 276 Water St., New York.

Wanted-A competent Die Sinker. Steady employment. Address E. P., Box 773, New York.

Collection of Ornaments.-A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent on receipt of \$2. Palm & Fechteler, 403 Broadway, New York city. Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

Wanted.-An Oil Mill of the most improved pattern for the manufacture of cotton seed oil from the seed of the Sea Island cotton. State price and terms. Address Spirit of the Times, Jasper, Fla.

Wanted .- A few sober, industrious Machinists and Moulders. Address H. B. Smith Machine Co., Smithville, Burl. Co., N. J.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 126. Mineral Lands Prospected, Artesian Wells Bored, by of the question. Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 125.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel - other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Sheet Metal Presses. Ferracute Co., Bridgeton, N. J. Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 45.

Nickel Plating. -Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Wright's Patent Steam Engine, with automatic cutoff. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

ment. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Presses. Dies. and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y. Bradley's cushioned helve hammers. See illus. ad. p. 110. power.

Forsaith & Co., Manchester, N. H., & 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Electrical Indicators for giving signal notice of extremes of pressure or temperature. Costs only \$20. Attached to any instrument. T.Shaw, 915 Ridge Ave. Phila.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Machinery. Patent Punches, Shears, etc. E. Lyon &

on another page.

Mica in sheet and scrap for sale in quantity to suit. Parties using Mica in any form please send for samples. Atlantis Land and Mining Co., Box 2762, Leadville, Col.

For Mill Mach'y & Mill Furnishing, see illus. adv. p.141. Telephones repaired, parts of same for sale. Send

stamp for circulars. P.O. Box 205, Jersey City, N.J. Eclipse Portable Engine. See illustrated adv., p. 94. PLEMENT, No. 196.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Soloman's Parallel Vise. Taylor, Stiles & Co., Riegelsville N. J.

Silent Injector, Blower, and Exhauster. See adv. p. 141. The Paragon School Desk and Garretson's Extension Table Slide manufactured by Buffalo Hardware Co.

Planing and Matching Machines, Band and Scroll Saws, Universal Wood-workers, Universal Hand Jointers, Shaping, Sand-papering Machines, etc., manuf'd by Bentel, Margedant & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery,'

Fire Brick, Tile, and Clay Retorts, all shapes. Borgne & O'Brien M'f'rs, 23d St., above Race, Phila., Pa

Diamond Engineer, J. Dickinson, 64 Nassau St., N.Y. The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

For Superior Steam Heat. Appar., see adv., page 142. Cut Gears for Models, etc. Models, working machinry, experimental work, manufacturing, etc., to order. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in Scien TIFIC AMERICAN of last week.

The E. Horton & Son Co., Windsor Locks, Conn. manufacture the Sweetland Improved Horton Chuck.

The best Truss ever used. Send for descriptive circular to N. Y. Elastic Truss Co., 683 Broadway, New York. Power Hammers. P. S. Justice, Philadelphia, Pa. p. 77. Inventors' Institute, Cooper Union. A permanent exhibition of inventions. Prospectus on application. 733 Broadway, N. Y.

For Reliable Emery Wheels and Machines, address The Lehigh Valley Emery Wheel Co., Weissport, Pa. Millstone Dressing Machine. See adv., page 142.

Comb'd Punch & Shears: Universal Lathe Chucks, Lambertville Iron Works, Lambertville, N. J. See ad. p.108.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

New Economizer Portable Engine. See illus. adv. p. 108. Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p.141. Totten & Co., Pittsburg. For Shafts, Pulleys, or Hangers, call and see stock ept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Engines repaired without loss of time, L. B. Flanders Machine Works, Philadelphia, Pa.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and thepage, or the number

Correspondents whose inquiries do not appear after reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and lahor to obtain such information without remuneration.

Any numbers of the Scientific American Supple-MENT referred to in these columns may be had at this office. Price 10 cents each.

(1) P. G. asks: 1. With what substance are the porous cups of a Leclanche battery filled? A. With granular black oxide of manganese. Some makers fill them with equal parts of black oxide of manganese and retort carbon. 2. How is hard rubber polished? A. It is first filed or turned into shape, then smoothed with emerypaper, then with powdered pumice stone applied with a felt wheel or felt rubber. The final polish is given by fine whiting and water applied with a brush.

(2) L. C. C. asks: How many horse power do you think would be required to propel a yacht at a vessel and cargo 4,000 lb.? A. From six to eight horse

(3) M. F. R. writes: I think of building a small boat, and would like you to tell me what size single engine and boiler I should get. Length of boat 32 feet, 7 feet beam. It is not to be a flat bottom, and I want to put on a stern wheel, as our river will not admit of a screw. What size wheel shall I use, and how wide should the paddles be? A. About 7 inch cylinder and 18 inches stroke; wheel 7 feet diameter and 9 inch bucket: vertical tubular boiler 34 inches diameter and 6 feet in height.

(4) A. L. K. writes: We have here in this

runany nearer than that. Can you give the reason? A. The effect noted by you is due to electrical induction. An intermittent or vibratory electric current passing over a line will induce a current in a parallel line, even if the two wires be several feet apart. This phenomenon is beautifully illustrated by Hughes' induction balance and sonometer, fully described in SUP-

MINERALS. ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

H. J. F.-1. Quartz, decomposed hornblende and feldspar. 2 Coccolite in quartz. 3. Mispickle and mica slate. 2 and 3 may carry a small amount of silver. -J. C. D.-It is metallic antimony, worth about 18 cents per lb. in large quantities.

COMMUNICATIONS RECEIVED.

New Copying Process. By E. P. T. On Sun Spots. By E. E. B. Another New Copying Process. By E. P. T.

[OFFICIAL.]

INDEX OF INVENTIONS

Letters Patent of the United States were Granted in the Week Ending

February 3, 1880, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, or any patent issued since 1867, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired, and remit to, Munn & Co., 37 Park Row, New York city.

	Addressing machine, W. E. Woodruff, Jr	. 224,06
	Air compressor, W. R. Eckart	. 224,08
	Animal trap, H. Shulenbarger	. 224,23
	Arrow rest for hows, N. R. Streeter	224.11
	Audiphone, T. W. Graydon Axle box, car, W. G. Mitchell Axle lubricator, car, S. J. & G. J. Shimer	224,17
	Axle box, car, W. G. Mitchell	224,209
	Axle lubricator, car, S. J. & G. J. Shimer	. 224,047
	Axle, vehicle, J. Conniff	. 224,077
	Bag tie, M. Y. Hall	924.040
	Barrel lifter LV Brown	224,046
	Barrel litter, W. Brown Bed bottom frames, etc., corner fastening for connecting, W. F. Moody	. ~~=,=01
	connecting, W. F. Moody	224,028
	Beer, manufacture of, G. C. Holderer	224,186
	Berth, oscillating ship's, T. O. L. Schrader Binder, temporary, J. T. Foster	224,232
	Binder, temporary, J. T. Foster	224,164
	Bird cage, F. W. Flato	224,163
	Blind, inside, J. M. Abbott	223,973
	Blotter, J. A. Austin	224,124
	Boot tree, G. W. Badger	224,067
ı	Bottle stopper, J. J. Allison	224,122
	Bow, J. B. Robinson	004 056
	Bucket, soil, S. W. Jones	994 019
	Buckle, suspender, G. R. Kelsey	
	Building, fireproof, J. Gilbert	
	Burglar alarm, J. Israel	224,017
I	Burgiar alarm, J. Israel Burgiar alarm, electric, W. L. Voelker Butter, etc., cover and cooler for, W. E. Barrows.	224,060
I	Butter, etc., cover and cooler for, W. E. Barrows.	224,126
I	Button and stud. N. F. Mathewson	224,098
I	Button, detachable, J. P. Carpenter	224,144
I	Button, separable, J. P. Carpenter	
	Buttons, etc., from fibrous material and powdered	004.000
	hoof, manufacturing, W. F. Niles	
ı	Car coupling, Bayliff & Harrod (r)	
i	Car coupling, F. A. Lewis	
i	Car coupling, G. H. Wilson	224.262
١	Car heater, M. Limpert	224,194
l	Car ventilator, C. W. Thomas	224,248
l	Carbonates and bicarbonates, manufacture of, A.	
l	Stearns	224,240
l	Carpet pads, machinery formaking, H. M. Small.	
	Carpet sweeper, E. K. Breckenridge	224,069
ļ	Caster, furniture, J. Toler	094 345
i	Casting metals, apparatus for, Taylor & Wailes	994 094
•	Catarrh, compound for nasal, G. L. Gorslene Chandelier, F. Rhind	224 226
!	Chimney ton and ventilator, G. W. & L. Demond.	224,154
i	Chock, gaff-topsail sheet, W. Metzler	224,027
	Chuck, scroll, D. E. Whiton	224,119
	Churn, H. Smelsor	224,112
	Churn, H. Van De Water	224,059
	Cigar packing press, F. C. Miller	224,208
	Clamp for carrying school books, H. Tollner	224,250
	Clay into tiles, etc., machine for pressing and	
	moulding, I. Hogeland	224,015
!	Clock, electro-magnetic, D. F. Sweet	
	Clothes wringer, Lawrence & Kerr	
	Coach or harness pad, Cahoone & Teas	
İ	Coffee roaster, J. H. Chamberlin	223,993
l	Compass, solar, F. Moore	224,102
	Cooking device R. B. Wakefield	224,252
i	Common M. Cohn	224,076
l	Cotton opener feed indicator, J. Hill	224,185
	Cotton picker, J. B. Parker	224,221
	Crushing, grinding, and amalgamating machine.	

	<u> 155</u>
T	
File for packages of letters, F. W. Sanguinet.	224,280
Fire extinguisher, H. Bohle Fire extinguisher, chemical, J. A. Shepard	223,98
Fireplace, J. H. Beard.	224.129
Gate, J. C. Mendenhall	224.100
Gearing for changing the speed of rotating sh	afts,
B. F. Shaw	224,045
Gearing to shafting, key for attaching, T. G. M. Gimlets, die for forming double twist, A. H.	.orse 224,103 1
J. S. Deuse	224.156
Glass or chinaware utensils, connecting parts	
J. Story	
Grain drier, J. L. Norton	
Grain drill, E. Kuhns (r)	
Grinding mill balancing device, H. Smith	
Hammer, horseshoe, H. N. Mallery	
Hammock support, J. Edson	224,178
Hatchway doors, operating, G. W. Mouldin	224,215
Heel leveling and surfacing machine, McKa Fairfield	
Heel piles, machine for forming, C. W. Glidde	en. 224,012
Heel slicing machine, C. W. Glidden	224,011
Hitching post, S. M. Furman	
Hop press, H. W. Mahan	
Horseshoe nails, machine for finishing, H.A.W Hydrant, J. Ward	
Ice machines, etc., production of cold in,	
Motay & Rossi	
Incubator, E. S. Renwick	
Inkstand, J. H. Wilcox	
Insect trap, A. N. Lovelace	
Jewelry manufacture, device for bending v	wire
for, A. M. English	224,004
Journal and bearing, car, J. H. McLean	224,205
Knitting machine, B. F. Shaw	
Ladder, step, M. N. Lovell Lantern, E. B. Requa	
Lantern, hand signal, W. Armstrong	
Last, L. W. Shorey	
Latch, A. B. Prouty	
Lather, tool post for turning, G. S. Fales Leather, machinery for assorting pieces of, H.	
Fairfield	
Leveling instruments, tripod head for, L.	
Denison	224,155
Lifting Jack, J. S. Kirkwood (r)	9,065
Lighting device, J. J. Lawler	224.192
Liquid cooler, C. A. Maus	
Loom reed, E. Adamson	
Loom temple, N. I. Allen	223,976
Lounges, reversible back for, R. L. Fairbank.	
Measure, grain, H. M. Dygert	224,158
Millstone dressing machine, D. S. Greenwald.	
Moulding and perforating plastic substances,	
paratus for, A. Stearns	224,239
Moss, treating and curing Spanish, H. T. Cu	1m-
mings Motion transmitter, rotary, C. L. French	224,000
Motion, transmitting rotary, C. L. French	
Music rest for pianofortes, E. A. G. Roulstone	
Musical chart, Cleave & Gordon	
Musical instruments, automatic key board atta	
ment for, W. J. Crane	
Nickel, electro-deposition of, J. Yates	
Oil, apparatus for extracting, S. G. Clark	
Oil cake, envelope for the manufacture of, B	rit-
tain & King	
Oil condensing and separating apparatus, co	
J. H. & W. F. Nicolai	
Oscillating engine, J. F. Kingsley	
Oven slide, L. A. Weiner	224,255
Overalls. J. B. Glover	224,175
Paper box, wood lined, J. W Sprowles	
Paper cabinet, E. A. Gilson	
Paper pulp from pine leaves, making, C. Fultol	
Paper pulp, machinery for grinding wood f	
W. A. Doane	

Pen, stylographic fountain, Fisher & Downes.... 224,162 Pianoforte action, H. Ketten 224,091
Pianoforte action frame, upright, C. S. Fischer 224,008 Pipe, collapsible ball for welding, T. J. Bray.... 223,986 Piston head, J. West 224,258
Pitcher, molasses, B. F. Culver 224,080 Pitman, A. H. Merriman 224,207
Plaiting machine, M. A. Maybee 224,201
Planter and fertilizer, check row corn, H. F.

 corn, D. A. Swanson
 224,242

 Planter, corn, T. B. McConaughey
 224,099

 Plow, J. B. Bruce
 223987

 Plow attachment, L. Price
 224,223

 Plow, reversible, C. C. Brooks..... 224,136 Plow, rotary gang, C. R. Foster...... 224,009

 Plow, sulky, W. A. James
 224,188

 Plow, sulky, A. Lindgren
 224,195

 Plow, sulky, B. F. Litzenberg
 224,095

 Pole, carriage, W. A. Galbraith 224,171
Polishing machine, A. Newhall 224,214 Polishing small articles, machine for, G. G. Guild 224,086 Post office bo door, W. H. Camp...... 224,142 Potato digger, L. A. Aspinwall...... 224,123 Pressure regulator, fluid, Kipp, Jr., & Murphy... 224,130
Printing machine, plate, A. H. Bogart....... 224,131 machine, rotary, G. Bissinger... Propeller, vibrating, H. K. Shanck 224,233

 Pump, E. T. Ligon
 224,193

 Pump, vacuum, W. H. Guild, Jr
 224,179

 Radiator, steam, G. W. Blake
 224,131

 Radiator, steam, Tudor & Evans 224.055 Rag engine, bed plate for paper, G. A. Corser..... 224,079

 Cultivator, C. D. Carter
 224,074

 Cultivator, S. G. Pomeroy
 224,039

 Railway switch, C. Donkersley 224,157
 Refrigerator, J. H. Porcupile
 224,222

 Refrigerator building, H. Smith, Jr.
 224,048

 Rocking chair, adjustable, M. F. Bell
 224,130
 Cultivator, sulky, H. R. Burdge 224,139 Cymbal, drum, T. W. McKeever 224,204

 Desk, school, J. Glendenning
 224,174

 Door check, N. Kidney
 224,092

 Door hanger, T. H. Bottomley
 223,985

 Draugnt or tuglink, spring, J. F. Miller. 224,210 Saddle tree, harness, E. R. Caboone 223,989
Drawer front, B. A. Armstrong 224,066 Saddle tree, harness, Cahoone & Teas 223,990
Dredging machine, Maguire & Alexander 224,197 Salt, manufacturing fine, T. Hissin 224,090 4) A. L. K. writes: We have here in this dachinery. Patent Punches, Shears, etc. E. Lyon & five hundred feet. Two of them use the Bell telephone, and one the Edison. Now, when they are using the nanother page.

(4) A. L. K. writes: We have here in this city three telephone lines running parallel for four or five hundred feet. Two of them use the Bell telephone, and one the Edison. Now, when they are using the Edison we can hear every word said by listening at either of the other lines, and they are not within two another page.

(4) A. L. K. writes: We have here in this city three telephone lines running parallel for four or five hundred feet. Two of them use the Bell telephone, and one the Edison. Now, when they are using the Edison we can hear every word said by listening at either of the other lines, and they are not within two another page.

(4) A. L. K. writes: We have here in this city three telephone lines running parallel for four or five hundred feet. Two of them use the Bell telephone, and one the Edison. Now, when they are using the Edison we can hear every word said by listening at either of the other lines, and they are not within two another page.

(4) A. L. K. writes: We have here in this city three telephone lines running parallel for four or five hundred feet. Two of them use the Bell telephone, and one the Edison. Now, when they are using the Extension table, W. Fay.

Extension table, W. Fay.

Scaffold, portable window, J. Skidmore.

224,024 Sauth manufacturing fine, T. Higgin.

224,024 Salt, manufacturing fine, T. Higgin.

224,025 Salve, J. Myers.

224,026 Extension table, W. Fay.

224,027 Sawmill dog, T. Craney.

224,028 Scallock, Thomer & Kohazy.

224,028 Salve, J. Warmill dog, T. Craney.

224,029 Sawmill dog, T. Craney.

224,029 Sawmill dog, T. Craney.

224,020 Sawmill dog, T. Craney.

224,020 Sawmill dog, T. Craney.

224,021 Scallock, Thomer & Kohazy.

224,025 Scallock, Thomer & Kohazy.

224,026 Salve, J. Warmill dog, T. Craney.

224,027 Sawmill dog, T. Craney.

224,028 Salve, J. Warmill d