Business and Lersonal.

The Charge for Insertion under this head is One Dolla 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 best results are obtained by the Imp. Eureka Turoine Wheel, and Barber's Pat.Pulverizing Mills. Send for descriptive pamphlets to Barber & Son, Allentown. Pa.

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Fine Taps and Dies in Cases for Jewelers, Dentists, and Machinists. Pratt & Whitney Co., Hartford, Conn. For Sationary or Portable Engines, Circular Saw Mills, Grist Mills, and Mill Machinery.good and cheap, addres

the old manufacturers of Cooper Mfg. Co., Mt. Vernon, O. H. Prentiss & Co., 14 Dev St., New York, Manufs,

Taps, Dies, Screw Plates, Reamers, etc. Send for list. "Workshop Receipts" for Manufacturers, Mechanics, and Scientific Amateurs. Illustrated. \$2, mail free. E. & F. N. Spon, 446 Broome St., New York.

For Screw Cutting Engine Lathes of 14, 15, 18, and 22 in. Swing. Address Star Tool Co., Providence, R. I.

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The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are being sold out very low by the George Place Machinery Agency, 121 Chambers St., New York,

Hydraulic Presses and Jacks, new and second hand Lathes and Machinery for Polishing and Butting Metals. E. Lyon & Co., 470 Grand St., N. Y.

Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel-other kinds imitations and inferior. -Our name is stamp n full o 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.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

Best Power Punching Presses in the world. Highest Centennial Award. A.H. Merriman, W. Meriden, Conn. For Sale-By A. J. Riddle, Eufaula, Ala., seven Negaves of Andersonville Stockade Prison, taken August 17, 1864. while 33,000 men were incarcerated. Size of plates, 4¼ x 5%. Price, \$500.

Deoxidized Bronze. Patent for machine and engine journals. Philadelphia Smelting Co., Phila., Pa.

Having enlarged our capacity to 96 crucibles 100 lb. each, we are prepared to make castings of 4 tons weight. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N.Y. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever. Wanted .- The address of "manufacturers of novel-

ties." Howard Bros. & Co . Wheeling, West Virginia.

NEW BOOKS AND PUBLICATIONS.

BETRIEBS-EINRICHTUNGEN AUF AMERIKAN-ISCHEN EISENBAHNEN. Von H. Bartels. Berlin: Ernst & Korn.

Contains a clear and concise description, illustrated, of the stations, freight depots, cattle yards, oil docks, water powers, coal yards, switches, turntables, signals and signal service of the American railways. The author traveled on the Pennsylvania and Western roads in 1876 and '''. The subject of which the book treats was not well known in Germany, as can be seen from the fact that this book was published upon order from the Secretary for Commerce and Manufacture. We are indebted to the Smithsonian Institution, Washington, for a copy of the work.

TABLES OF THE PRINCIPAL SPEEDS OCCUR-RING IN MECHANICAL ENGINEERING. By P. Keerayeff. London and New York: E. & F. N. Spon.

This little pamphlet must prove of great use to mechanical engineers and users of machinery, especially as the subject is meagerly treated in pocket engineering

THE NEW ENGLAND BUSINESS DIRECTORY for 1879. Boston; Sampson, Davenport & Co. 8vo. pp. 1,576. Price \$6.00.

This, the ninth issue of the New England Business Directory, will be of practical value and assistance to every man having business interests in, or connection with, those States. Its classification is such that one can find in a moment the names and post office address of every man or firm, in any business, in any town in New England. The book is well made, and contains a good map of the Eastern States.



FINTS 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 me the date of the paper and the page, or the number

of the question. Correspondents whose inquiries do not appear after reasonable time should repeat them,

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 labor 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) A. MCC. asks: 1. What length and sizes of wire for primary and secondary coils would be required for an induction coil to give a ¼ inch spark for the electric pen described in No. 8 of present volume diameter and 31/2 inches long, two layers of No. 16 silk covered wire for the primary. For the secondary wind over the primary about 15 layers of No. 36 silk covered wire, insulating the separate layers as well as the primary from the secondary with two thicknesses of shellacked writing paper. You will need a condenser. 2. In "Notes and Queries," No. 32, March 22. 1879, you answer a like question from A. L. S., by saying "a coil 40 feet. giving an 8 inch spark will do." This is evidently a

misprint; an 8 inch spark is a very powerful one. Do you mean a 1/8 inch spark or an 8 inch coil? A. It was a misprint; it should read-a % (one eighth) inch spark will do. 3. I have a small coil made for a medico-electric apparatus. It is 2 inches diameter by 51% inches long and gives powerful shocks, but, though I have made forit a condenser with 350 square inches tin foil (700 in counting both surfaces) it will not give a spark more than one twentieth inch long, when used with the zinc and copper, sulphate of copper battery jar belonging to it. I have used it with a more powerful battery, before attaching the condenser, but could see no spark. The circuit braker is a thin spring about one-fiftieth inch thick, nine-thirty-seconds inch wide, 11/4 inch long, Does it need more wire, a better, i. e. lighter spring, or more battery power? A. It is probable that the coil is not made with sufficient care to give a spark of any considerable length. The insulation must be very perfect. (2) L. writes: 1. In making brass cocks that are used to control the flow of water in hydraulic cotton presses, can they be made solid by using a core in the mould? A. Yes. 2. If a core can be used, what should it be made of? Made of common sand they all come out full of small holes just under the scale. A. list). Models, experimental work, and machine work, River sand 2 parts, loam 1 part, and a very small quantity of wheat flour. Mix well together and moisten preparatory to moulding, with stale beer or with water to which a little molasses has been added.

(3) F. C. J., referring to query (20), page 23. current volume, writes: It seems to me the answer should be four feet instead of three. A. Test the question practically by weighing any uniform bar of iron on two ecales, or spring balances. If it was placed at 4 feet the two men would carry two thirds and a part of the other third. See answer to W. P. P. on this page.

man to carry, but one end of four feet. See answer to loader, everything else being equal both as regards close-F. C. J. on this page.

(5) H. J. P. asks if the Corliss engine which was at the Centennial was the largest ever built? A. We believe it was the largest Corliss engine which had been built up to that time.

(6) A. D. R. asks if the mercurous sulphate battery gives off poisonous fumes, or fumes that would destroy metallic apparatus. A. If pure sulphate were used the amount of anything given off would be inappreciable under ordinary circumstances. These batteries should not, however, be kept in a warm place.

(7) J. H. G. asks: How can I make an emery wheel out of a cast iron one? A. Cement to the periphery of the wheel a strip of leather, allowing the ends to overlap each other. Coat the leather with about 200° Fah.

(8) F. L. R. asks: What causes halos around the sun and moon, and what do they indicate, if anything? A. They are formed by reflection of light from minute crystals of ice floating in the atmosphere or from watery vapor. They generally indicate a change of weather.

(9) C. M. R. writes: 1. I have constructed an induction coil, 134 inches by 11/8, Nos. 26 and 36 silk covered wire used in its construction, and each layer is insulated with paraffined paper. Also a condenser containing 324 square inches of surface mica insulated. Have proved the insulation with galvanometer. The coil without condenser will yield a spark 16 of an inch, but with condenser in primary circuit, as per drawings and description in Scientific American Supplement. No. 160, Fig. 4, the spark will not pass even at half that distance, though the shock which one may receive by completing the circuit with the hand is greatly increased. Are these results such as might be expected, or should the coil yield a spark at greater distance with the condenser in. and if so. where is the fault? A. Your primary wire is too small, and your condenser must be in some way defective. See that the two parts are everywhere well insulated from each other. Possibly less condenser surface would be better; the coil should certainly yield a longer spark with than without a condenser. See reply to A. McC. on this page. 2. How is the Trouve battery constructed? A. See SCIENTIFIC AMERICAN SUPPLEMENT No. 159.

(10) J. W. W. writes: I am making a dynamo-electric machine according to drawings in Sup-PLEMENT No. 161, only three times the size instead of twice. What would be a suitable number of wire to wind the magnets and armature? The machine is intended for general experimental purposes, with reference more particularly to the production of a small electric light. A. You would probably obtain good results by winding the magnets with No. 14 wire and filling the armature with No. 16.

(11) C. B. B. asks: How can I polish fancy woods? A. Apply with a woolen rubber a mixture of alcoholic shellac varnish 3 parts, boiled linseed oil 1 part. Rub the work briskly until the shellac is hard.

(12) J. A. D. writes: In No. 162 of the SCIENTIFIC AMERICAN SUFPLEMENT you describe a simple electric light. 1. How many Bunsen cells would be for February 22, 1879, p. 121? A. Wind over a well required and how long would the light last? A. I would insulated core of No. 18 annealed wires, 1/2 inch in require about 8 or 10 cells. 2. Would a piece of carbon from a lead pencil answer for the thin carbon rod? A. No. 3. In No. 160 SCIENTIFIC AMERICAN SUPPLEMENT is a description of an induction coil. Is there a simpler way of making a commutator. If so, please describe it, and if possible by diagram. A. See answer to W. G. S. on this page. 4. How long a piece of tin foil is needed for 40 square feet of surface if it is one foot wide? A.

> (13) W. G. S. asks: 1. Could the commutator described in connection with the induction coil (SCIENTIFIC AMERICAN SUPPLEMENT No. 166) be made like that of Professor Hughes' induction balance (page 244 in current volume of SCIENTIFIC AMERICAN), and if so describe connections and give details of making? A. You may make one on a similar principle by connecting with each binding post a button, and driving three round headed screws into the board, so that either the middle screw or one of the outer ones may be touched by one of the buttons, and the middle and the other outer screw may be touched by the other button. Connect the middle button with one terminal of the primary coil and the two outer buttons with the other terminal and you have it. 2. What would be the price of the induction coil? A. \$35 to \$40. 3. How can I make a pair of spools suitable for a telegraphic instrument or electric call bell? A. As you do not give the resistance of your proposed linewe cannot give you a definite answer. If the bell and instrument are intended for experiment only, probably the following would do: Turn two very thin wooden spools, 1% inch long, 3% inch internal diameter. Wind them with about 8 layers of No. 20 cotton covered wire. 4. Could I make a Trouve battery of a number of zinc and copper plates in the same cell, and would it be of sufficient power to be felt? A. You can make a battery in the way you propose, but you will not be able to feel the current from it without using a great number of pairs or employing an induction coil. est boat.

(14) J. A. McC. asks: 1. Is not the office of the line wire in the acoustic telephone to transmit the vibrations of the diaphragm from the transmitting to the receiving instrument? A. Yes. 2. If this be correct, would it not be better to use as light a wire as possible? A. Yes. 3. If this also be correct, would it not be better to use hard drawn wire on account of strength and lightness, instead of soft? A. No. on account of (4) W. P. P. writes: On page 283, current | its resonance. 4. What is the durability of the diaphragm volume, query (20), relating to the carrying of a 12 foot in this instrument when made of thin iron, or has it shaft by three men, two carrying it by means of a lever been tested? A. We see no reason why it should ever and the other by taking one end, you state that to fail. 5. Is there anymore danger of damage from lightdistribute the weight of the shaft equally between the ning on lines of one mile and less without ground conthree men, the lever should be placed three feet from nections than there would be from a badly put up lightthe end. Is this right? I think it should be placed 4 feet ning rod to a house or other building? A. More danfrom the end, because the 4 feet one side of the lever ger to the operator because the line extends over a would balance 4 feet on the other side of the lever, leav- greater area. You should use a lightning arrester. 6. Can ing 4 feet for the man at the other end. Am I right? youtell me if there is any foundation infactfor the idea A. True, 4 feet on one side of the lever balances 4 feet generally prevalent among western hunters that a breech on the other—but this does not leave 4 feet for the other loading shot gun will not shoot as well as a muzzle ness and penetration? A. We think a well made breech loader the best.

> (15) J. H. W. asks for the best way to keep steam boilers through the summer that are used for heating purposes in winter. A. Fill them entirely full of water and paint the outsidewell.

> (16) D. B. B. asks can power be obtained by air pressure in the cylinder of an engine in the same manner as from steam. A. Yes. See Mr. Haupt's report published in Nos. 176 and 177 of the SCIENTIFIC AMERI-CAN SUPPLEMENT.

(17) J. L. G. asks: 1. What is meant by saying an engine cuts off at 1/4 or 1/4 stroke? A. Cutting off the steam at the time when 1/4 or 1/4 the stroke is made. 2. How is the valve set when it cuts off at 1/2 rather thick glue, and roll the wheel in emery heated to stroke and when it cuts off at 1/4 stroke? A. We cannot explain to you the set of the valve, as it depends upon the kind of valve and valve motion. 3. Are the fire sheets of a large flue boiler the same as the other sheets? A. Yes. 4. What is the diagram often mentioned in connection with steam engines? A. By examining the back numbers of this journal you will find descriptions and cuts of engine diagrams.

> (18) D. C. H. asks for a receipt for making paste to make paper adhere to tin. A. Soften 4 parts of glue in 15 of cold water, and then moderately heat until the solution becomes quite clear. Then add 65 parts of boiling water, and agitate. In another vessel stir up 30 parts of starch paste with water enough to form a milky liquid without lumps, and into this pour the boiling glue solution with constant stirring. Continue the boiling for a few minutes, and add, after cooling somewhat, a drop or two of carbolic acid to each gallon of paste. Keep the paste in closed vessels.

> (19) P. A. L. asks if bismuth is extensively used. What is its value? A. Bismuth is chiefly used for certain alloys, as Newton's and Rosse's fusible alloys, etc. The basic nitrate and the carbonate are used in medicine. Magisterium tismuthi or blanc de ford is used as a cosmetic. Bismuth is worth about \$2.25 per pound.

> (20) J. C. asks: 1. Do you know of any locomotive in Wales or England that weighs 120 tons? A. No. 2. What is the weight of the heaviest American locomotive that you know of? A. About 60 tons without tender. 3. When is a locomotive heaviest on the rail, when it is running or when it is standing? A. When running up a concave grade.

> (21) B. F. M. asks: 1. Will it materially weaken 34 inch pipe to bend it cold into coil of 20 inches internal diameter? A. No, if of good iron. 2. Can a pump be made-and how-to work boiling water coming out of boiler at about 150 lbs. pressure? I wish to take the water out at one side and pump it in again at the other. A. Place your pump a distance below the boiler, so that the water will fill the pump by gravity.

> (22) J. J. B. writes: A friend of mine has in constant use three return tubular boilers side by side, two of which areconnected withone smokestack,60 feet high; the third is connected with another smoke stack, same dimensions and height as the one referred to. The smoke stacks are of brick, and stand about seven feet apart. The first smoke stack referred to has not quite sufficient draught for two boilers, the other has more than enough for one. Will connecting the two stacks be of any benefit in running the three boilers, if so, how near the surface of the ground should the connection be made? A. Yes, if properly done. The flues of all the boilers should be brought together and then divided to lead off to the two chimneys

> (23) T. P. H. asks: 1. Will not a keel do as wellas a centerboard in the boat of which plans are given in No. 29 of SUPPLEMENT? A You will not be able to carry so much sail with the ordinary keel unless the boat is ballasted. 2. If so, what depth and thickness should the keel be made? A. 2 inches thick and 414 inches deep.

Portland Cement-Roman & Keene's, for walks, cisterns, foundations, stables, cellars, bridges, reservoirs, breweries, etc. Remit 25 cents postage stamps for Practical Treatise on Cements. S. L. Merchant & Co., 53 Broadway, New York.

Pulverizing Mills for all hard substances and grinding purposes. Walker Bros. & Co., 23d & Wood St., Phila., Pa. Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Messrs. Alsop & Clark, Jacksonville, Fla., after using 1 bbl. of "Downer's Boiler Liquid," write thus: "Your Boiler Liquid is all that you represent it to be. Inclos find sight draft in settlement of bill. Please ship us anonce." It stands the test of a thorough trial. A. H. Downer, proprietor, 17 Peck Slip.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

Machine Cut Brass Gear Wheels for Models, etc. (new generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Howard's Bench Vise and Schleuther's Bolt Cutters Howard Iron Works.

(24) J. H. C. asks: Can you tell me when and where cycloidal teeth were first used for gear wheels? Who is supposed to have invented them? A. Camus, a French mathematician, describes cycloidal gearing in a work published in 1752 and translated into English about 1806. 2. Are the profiles of "involute" teeth approximate involutes, or are they but one of the curves of cycloidal profiles? A. Approximate involutes. 3. Can you refer to any work containing the history of gearing? A. There is no such work that we know of.

(25) W. R. writes: 1. Suppose two side wheel steamers of unequal size run with equal speed in still water, should the larger boat be able to beat the smaller one against a current because the current has more effect on the smaller boat? A. The one having the greatest propelling power in proportion to its weight, should be the most efficient against the current. 2. Can a hoat run in shallow water (not touching bottom) as well as in deeper water, other things being equal? No. 3. If two unequal but similar boats stop their engines when even and going at the same speed, which will stop first? A. Other things being equal, the lightis paper passed that it may resist the influence of water square of the distance. and fire? A. For processes of waterproofing paper, consait SCIENTIFIC AMERICAN SUPPLEMENT No. 96. A in close proximity, if insulated, retain each their sepasaturated $\epsilon queous$ solution of sodium tungstate may be used to render paper uninflammable. 2. What chemicals are used in the manufacture of lumber from paper? A Usually a concentrated aqueous solution (hot) of zine chloride,

(27) J. T. G. asks how to remove the paper patterns from scroll work. A. Moisten it and scrape it off. It is better to trace the pattern than to paste it on the work. It is a good plan to paste the pattern on a piece of vencer and preserve the whole as a pat tern after sawing.

(28) P. B. C. writes: 1. I have a well, 14 rods from house, at 26 feet rise from well to house. I have common force pump, 11/4 inch diameter by 4 inches stroke. Will the pump force water through a 1/2 inchpipe to the house? A. Do not use less than 34 inch pipe. 2. Will an air chamber on the pipe help it any? A. Yes. 3. How large a windmill will it take to drive the pump? A. 8 feet.

(29) J. M. H. asks for dimensions for a pleasure skiff twenty feet long. A. 20 feet long, 3 feet 3 inches wide at bottom and 4 feet at top, and 18 inches deep, 7 inches shear forward and 4 inches aft: stern 2 feet 10 inches wide.

(30) G. L. W. asks: 1. What would be the power of an engine 8 inches by 10 inches stroke, with 100 lbs. stcam pressure, making 100 revolutions per minute? A. See page 267(4), current volume of the Sci-ENTIFIC AMERICAN. 2. What is meant by mean effective pressure? A Average pressure on the steam side of the piston, greater than the retarding pressure on the exhaust side.

(31) "Subscriber" writes: 1. We have a line of steam pipe, one hundred and twenty-one feet long, and have some difficulty in keeping our union joints tight. Would we gain anything by putting expansion joint in the line, and if so, would one be sufficient? A. Certainly, put in an expansion joint, or else suspend the pipe so that it can expand and contract freely. 2. Will asbestos cement rust steam pipe or a boiler? A. We think not.

(32) H. F. asks: Is there any astronomical reason known why the earth, one of the smaller planets, was selected by the Almighty to be the habitation of man? A. Neither known nor possible to be known. It does not fall within the province of astronomy to discover the motives of the Almighty in ordering things as they are. Science endeavors to discover the conditions of phenomena: it has no business with the infinite why of existence,

(33) C. P. M. writes: I have made a phonograph from drawings in SCIENTIFIC AMERICAN SUPPLE-MENT No. 133 but fail to make it work. I have followed directions implicitly, and I thought perhaps you might give me some light as to some essential part that I had overlooked. The needle makes the groove all right, but does not seem to make any dots if I speak into it, nor does it reproduce sound when turned back. A. It may be that your diaphragm is too thick or too heavily damped, or it may be that your month piece is not tight. You should also bear in mind that it is necessary to speak quite loudly and clearly to the instrument

(34) J. J. B. H. asks for the meaning of the term " angular aperture," as applied to microscopical objectives. A. The angular breadth of the cone of light which a microscope receives from an object, and transmits to the e je, is called its angular aperture.

(35) T. E. W. writes: If a hole were made through the earth, passing through the center, and a bullet dropped into the hole, would the bullet stop at the center, or pass through nearly to the other side, oscillating to and fro, losing a little distance each time, until it finally settled at the center? I hold that it would not pass the center; that at the center the weight would be nothing, the attraction nothing (or balanced), and the velocity nothing. My friend holds that it would reach the center with enormous velocity, and be carried through to the other side. Please say which is right. A. We think your friend is right. The bullet, upon arriving at the center of the earth, would have an amount of accumulated energy (so to speak) or momentum, that would be expended by passing beyond the center against the action of gravitation, then would return again under the action of gravitation

(36) "Student" writes: 1. I have an engine, 8 inches diameter and 12 inches stroke. Purchased it for 15 horse power, hut with 100 lbs. steam and 100 revolutions per minute, I calculate 24:50 by your rule, allowing 1-5 for friction. 1. Am I correct? A. Yes; but have you sufficient boiler? It is a badly proportioned engine to get that amount of power from. 2. Have I

(26) H. B. asks: 1. Through what process poles? A. No; magnetic attraction is inversely as the C

(39) F. A. S. asks: 1. Will several magnets rate power? A. No. The magnets will mutually enfeeble each other. 2. Does pointing a magnet concentrate its power at the points? A. Yes, to some extent. 3. How near the neutral line on a magnet can the coil be placed, and still have its effect in the telephone? A. The coil of a telephone should be near the end of the magnet. We do not think the telephone would work at all with the coil near the mean line of the magnet; that is if the magnet were of any considerable length.

(40) J. M. S. writes: Suppose we place 3 wheels on the axle of a locomotive scenre, and let the outside wheels be twice as large as the center one, and then we raise the track for the middle wheel so that they may all have an equal hearing on the tracks. Now in traveling a certain distance of course it does not take as many revolutions of the large wheels as of the small one, but as they are all fast to the same axle, one cannot make more revolutions than the other. How is the distance gained by the small wheel, and does it slip on the track? A. As you have two large wheels and but one small one, and the same weight supposed to be resting on each, the small one must slip.

(41) G. W. E. asks: If you take two cog wheels of the same diameter, the same number of cogs etc., place one of them stationary and revolve the one around the other, how many revolutions will the movable one make passing once around the other? A. Two.

(42) E. F. writes: I would like to know if there is anything made so as to filter the water before entering boiler, and is now in successful operation, and where it can be seen or had; or is there any composition or liquid, when mixed with the water, would precipitate the sediment to the bottom as in a tank. A. If you are troubled with a lime deposit, there are various feed water heaters that will relieve your trouble, as they are arranged so as to deposit most of the lime in the heater. Various materials are used to aid in the removal of deposits, but an analysis of the water should be made before proper advice could be given.

(43) C. C. S. asks (1) whether two lubricated hard substances will wear longer together than ne hard and one soft. A. Yes. 2. Would the result be the same where there is no lubricator used? A. Yes, F that is, the hard surfaces would wear the longest.

(44) J. O. H. asks: Can you give me a remedy for excitability, while reading or speaking before a school? A. Force of will and practice are the best remedies. It is said that a momentary inhalation of the vapor of ether will quiet the nerves and give a feeling of confidence, but we should greatly prefer the other remedies.

(45) T. S. V. asks: How hard or how soft will cast steel require to be before it is tempered? I claim that it is tempered when it is extremely hard, or when it is annealed very soft. Am I correct? A. Tempering is reducing the hardness of a piece of steel to any degree short of the softness produced by annealing by the application of heat. The operation of hardening does not properly include tempering.

(16) J. R. B. asks: Can you give me any $|_{\mathbf{H}}^{\mathbf{H}}$ receipt for bending white oak save the ordinary way by steaming? Is there any composition used? A. We do not know of any composition for this purpose. Boiling

the wood in water is sometimes preferred to steaming. (47) F. P. asks how much and what size wire he should use on electro-magnet, with core 7-16 inch diameter and 2% inches long, to be operated by one or two cells Grove's battery. A. You do not mention the purpose for which you intend using the magnet. Supposing you intend it merely for experiment, we suggest winding each core with 8 or 10 layers of No. 20 wire,

MINERALS, ETC.-Specimens have been received from the following correspondents, and $\frac{K}{r}$ examined, with the results stated: J.C. McL.-It is a fine sample of asbestos

COMMUNICATIONS RECEIVED.

On a Solution of the Convict Labor Question. By D. D. S. On Solar Circulation: Heat and Light. By E. F. D. On Rotary Motion. By H. J. M. M.

[OFFICIAL.]

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 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,031 215,103 215,103 215,103 215,103 215,103 215,103 214,980 215,182 214,980 215,104 215,104 215,104 215,104 215,104 215,103 215,033 8,703	 Atwater	$\begin{array}{c} 211,985\\ 215,175\\ 215,120\\ 215,120\\ 215,120\\ 215,120\\ 215,104\\ 215,082\\ 214,981\\ 215,163\\ 215,163\\ 215,143\\ 215,143\\ 215,144\\ 215,146\\ 215,162\\ 215,136\\ 215,136\\ 215,164\\ 215,1$
 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,063 215,031 214,995 214,995 215,182 214,980 8,695 215,182 215,182 215,182 215,182 215,045 215,160 215,132 215,023 8,703 215,144	Atwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk bolt or eatel, O. D. Hunter Trunk bolt or eatel, O. D. Hunter Trunk bolt or eatel, O. D. Hunter Type writing machine, P. Deming Type writing machine, F. Deschamps Type writing machine, F. F. Warner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, slide and eneck, F. Richardson Vapor and gas burner, H. McConnell. Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vehicle seat back and shifting rail, S. B. Cox Vencer, wood, A. B. Rice Vessel for preventing the shifting of cargoes, ma- vessel for preventing the shifting of cargoes, ma- rine, D. Knowles. Violin, S. B. Sexton Wagon body, H. H. Richards Waste pipe attachment, H. W. Atwater Water cooler, G. H. Mettee Weit or caisson, floating, K. Moller Wheel supp.rtung device, automatic idle, E.D.@in	$\begin{array}{c} 211, 985\\ 215, 175\\ 215, 126\\ 215, 120\\ 215, 120\\ 215, 104\\ 215, 104\\ 215, 163\\ 214, 981\\ 215, 163\\ 215, 163\\ 215, 163\\ 215, 162\\ 215, 162\\ 215, 162\\ 215, 162\\ 215, 162\\ 215, 144\\ 215, 162\\ 215, 144\\ 215, 145\\ 214, 982\\ 215, 148\\ 215, 148\\ 215, 148\\ 215, 162\\$
 Fence, J. W. Temby. Filter press, A. Drevernann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain neter, E. Reisert. Grain separator, J. H. Sturgeon. Grinding mill, middlings, J. Jones. Gun lock, W. M. Scott. Harvester, S. W. Moore. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and harden- ing, J. G. Meeker. 	215,183 215,183 215,166 215,066 215,066 215,003 215,031 215,103 214,995 215,009 215,182 214,980 8,702 8,692 215,049 215,160 215,078 215,160 215,078 215,163 8,703 215,032 215,033 8,703 215,144	Atwater. Atwater. Truck, bay, G. H. Smith. Trunk bolt or catch, O. D. Hunter Trunk bolt or catch, O. D. Hunter Trunk detro-magneticburglaralarm, A. W. Hall Turnstile register, F. D. Deschamps Type writing machine, P. Deming. Type writing machine, P. Deming. Type writing machine, F. F. Warner. Valve attachment, safety, H. G. Ashton. Valve, slide and steam, A. H. Mathesius. Valve, slide and steam, A. H. Mathesius. Valve, spring, H. Gardiner. Vehicle seat back and shifting rail, S. B. Cox Vehicle seat back and shifting of cargoes, ma- rine, D. Knowles. Violin, S. B. Sexton. Wagon body, H. H. Richards. Washing machine, J. C. Merritt. Waste pipe attachment, H. W. Atwater. Weather vane, E. S. Turner Weir or caisson, floating, K. Moller Wheel supporting device, automatic idle, E. D. lin Whiffictee, D. Foley	$\begin{array}{c} 211,955\\ 215,175\\ 215,125\\ 215,125\\ 215,124\\ 215,124\\ 215,124\\ 215,124\\ 215,125\\ 215,144\\ 215,162\\ 215,142\\ 215,162\\ 215,162\\ 215,162\\ 215,162\\ 215,162\\ 215,162\\ 215,164\\ 215,1$
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,031 215,103 215,103 215,103 215,103 215,103 215,103 215,100 215,182 214,980 215,160 215,075 215,132 215,075 215,132 215,033 8,703 215,144 215,168	Atwater	211,955 215,125 215,125 215,125 215,125 215,104 215,104 215,104 215,104 215,104 215,104 215,104 215,104 215,105 215,104 215,105 215,104 215,105 215,104 215,105 215,104 215,10
 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,066 215,07 214,995 214,995 215,182 214,996 215,182 215,182 215,182 215,182 215,085 215,160 215,132 215,023 8,703 215,144 215,088 215,092 2	 Atwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming Type writing machine, F. Berner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, slide and steam, A. B. Koen Vehicle spring, H. Gardiner Vehicle spring, H. B. Rice Vencer, wood, A. B. Rice Vessel for preventing the sbifting of cargoes, marine, D. Knowles. Violin, S. B. Sexton Waste pipe attachment, H. W. Atwater Waste pipe attachment, H. W. Atwater Water cooler, G. H. Mettee Weits, tube clamp for oil, I. N. Hinderliter Wieffletree, D. Foley Whiffletree, D. Foley Whiffletree, S. Loomer 	211,955 215,125 215,125 215,120 215,104 215,164 215,163 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,125,164 215,125,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevernann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain drying kiln, C. W. Boynton (r). Grin from cars, unloading, J. Jones. Gun lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat weit lining, S. Beatty. Hay tedder fork, F. G. Butler. Hoek, A. J. Stone. 	215,183 215,183 215,166 215,066 215,066 215,003 215,003 215,103 214,995 215,103 214,995 215,103 8,695 215,160 8,702 8,692 215,163 215,163 215,033 8,703 215,033 8,703	Atwater Atwater Truck, bay, G. H. Smith Truck, bay, G. H. Smith Truck, bay, G. H. Smith Truck, between the state of	211,9%5 215,125 215,125 215,125 215,125 215,104 215,104 215,104 215,102 215,115 215,143 215,114 215,102 215,105 215,105 215,105 215,125,125 215,125,125 215,125,125 215,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125,125 215,125,125 215,125,125 215,125,125 21
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,066 215,031 215,103 215,103 215,103 215,103 215,103 215,100 215,182 214,980 215,182 215,075 215,132 215,033 8,703 215,144 215,068 215,077 215,104	 Atwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk, cleetro-inagneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming Type writing machine, F. Beschamps Type writing machine, F. F. Warner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, slide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. B. Rice Vensel for preventing the shifting of cargoes, marine, D. Knowles. Wagon body, H. H. Riehards. Waste pipe attachment, H. W. Atwater Water cooler, G. H. Mettee Weather vane, E. S. Turner Weir or caisson, floating, K. Moller. Weils tube clamp for oil, I. N. Hinderliter. Wheel supporting device, automatic idle, K.D.Olin Whiffietree, S. Loomer Whiffietree, S. Loomer Whiffietree, S. E. Alden 	211,955 215,125 215,125 215,125 215,125 215,104 215,104 215,104 215,104 215,104 215,104 215,104 215,104 215,105 215,104 215,105 215,104 215,105 215,104 215,104 215,105 215,104 215,10
 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,066 215,07 215,07 215,103 214,995 215,103 215,182 214,995 215,182 215,182 215,078 215,167 215,167 215,167 215,072 215,073 215,073 215,072	 Atwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. Ø. Deschamps Type writing machine, P. Deming Type writing machine, F. F. Warner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Vapor and gas burner, H. McConnell. Vehicle spring, H. Gardiner Vehicle spring, H. B. Rice Vencer, wood, A. B. Rice Vessel for preventing the sbifting of cargoes, marine, D. Knowles. Violin, S. B. Sexton Waste pipe attachment, H. W. Atwater Water cooler, G. H. Mettee Weather vane, E. S. Turner Weits, tube clamp for oil, I. N. Hinderliter Whiffletree, D. Foley Whiffletree, S. Loomer Whiffletree, S. Loomer Whiffletree, S. Loomer Wind wheel, S. E. Alden Windmill, T. Alsop 	211,955 215,125 215,125 215,125 215,120 215,104 215,163 215,163 215,163 215,163 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,163 215,163 215,100 215,000 215,000 215,000
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach. Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain from cars, unloading, J. Jones. Gun lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat swat lining, S. Batty. Hay tedder fork, F. G. Butler. Hoe, A. J. Stone. Hoisting machine, T. N. Davey. Holadak, vehicle, H. F. Morse. Horseshee catk, G. K. Elvayer. 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 215,103 214,995 215,103 214,980 215,182 214,980 215,160 215,078 215,033 8,703 215,033 8,703 215,032 215,032 215,032 215,032 215,032 215,032 215,032 215,032 215,033 8,703	Alwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk, leetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, F. Peming Type writing machine, F. F. Warner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, stide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner Vehicle seat back and shifting rail, S. B. Cox Vencer, wood, A. B. Rice Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles Violin, S. B. Sexton Wagon body, H. H. Richards Waster cooler, G. H. Mettee Weather vane, E. S. Turner Weir or caisson, floating, K. Moller Weils, tube clamp for oil, I. N. Hinderliter Whiffletree, D. Foley Whiffletree, S. Loomer Whiffletree, S. Loomer Whiffletree, S. Loomer Whiffletree, S. Loomer Whiffletree, J. Foley Wind wheel, S. E. Alcen Wind weather, J. A. Conover Wind wweather, J. C. Pirrune	211,9%5 215,125 215,125 215,125 215,125 215,104 215,104 215,104 215,102 215,105 215,143 215,114 215,102 215,105 215,105 215,105 215,105 215,125,125 215,105 215,125,125,125 215,105 21
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,031 215,031 215,103 215,103 215,103 215,103 215,103 215,103 214,980 215,182 214,980 215,182 215,075 215,132 215,033 8,703 215,144 215,068 215,077 215,102 215,077	 Atwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk lecturo-inagneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming Type writing machine, F. Beschamps Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, slide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner. Weisel for preventing the shifting of cargoes, marine, D. Knowles. Violin, S. B. Sexton Wagon body, H. H. Riehards. Waste pipe attachment, H. W. Atwater Water cooler, G. Il. Mettee Weits tube clamp for oil, I. N. Hinderliter Weits tube clamp for oil, I. N. Hinderliter Whiefletree, D. Foley Whiffletree, S. Loomer Whirligi, H. V. Hartz Wind whell, S. E. Alden Wind wentilator, J. A. Conover Window ventilator, J. A. Conover 	211,955 215,125 215,125 215,125 215,125 215,125 215,104 215,148 215,148 215,148 215,148 215,148 215,148 215,148 215,157,168 215,168 215,168 215,168 215,168 215,168 215,168 215,168 215,168 215,168 215,168 215,070 215,078 21
 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,063 215,07 215,07 215,103 215,103 215,103 215,103 215,103 215,182 215,182 215,078 215,162 215,078 215,022 215,023 8,703 215,144 215,068 215,07 215,150 215,07 215	Alwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. D. Deschamps Type writing machine, P. Deming Type writing machine, F. P. Marner Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius. Valve, slide and steam, A. B. Steener, Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. B. Rice. Vencer, wood, A. B. Rice. Vessel for preventing the sbifting of eargoes, ma- rine, D. Knowles. Violin, S. B. Sexton Wagon body, H. H. Richards. Washing machine, J. C. Merritt. Waste pipe attachment, H. W. Atwater. Weather vane, E. S. Turner. Weir or caisson, floating, K. Moller Weels tupe champ for oil, I. N. Hinderliter Whiffletree, D. Foley. Whiffletree, S. Loomer Whiffletree, S. Loomer Whifflig, H. V. Hartz Wind wheel, S. E. Alden Windmill, T. Alsop. Window washer, G. Pirrung Wrench, J. G. & G. G. Johnson.	211,9%5 215,125 215,125 215,120 215,104 215,164 215,163 215,164 215,163 215,164 215,162 215,145 215,162 215,162 215,164 215,162 215,164 215,162 215,164 215,162 215,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach. Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, Baker & Withington (r). Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain from cars, unloading, T. L. Clark. Grain separator, J. H. Sturgeon. Grinding mill, middlings, J. Jones. Gun lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat weit lining, S. Batty Hay tedder fork, F. G. Butler. Hoe, A. J. Stone. Holack, vehicle, H. F. Morse. Horseshoe calk, G. K. Flower. Horseshoe calk, G. K. Flower. Hudy, vehicle wheel, N. P. Bowsher. Hyrdwark E. A. Bonson. 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 215,103 214,995 215,009 215,182 214,980 215,182 215,163 215,162 215,078 215,033 8,703 215,032	Alwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk, leetro-inagneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, F. Deschamps Type writing machine, F. F. Warner. Valve attachment, safety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, stide and steam, A. H. Mathesius Valve, stide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Valve, stide and starm, A. H. Connell. Vehicle spring, H. Gardiner. Vehicle scat back and shifting rail, S. B. Cox Veneer, wood, A. B. Rice. Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles. Violin, S. B. Sexton Wagon body, H. H. Richards. Washing machine, J. C. Merritt. Water cooler, G. H. Mettee Weather vane, E. S. Turner Weir or caisson, floating, K. Moller Weils, tube clamp for oil, I. N. Hinderliter Weils, tube clamp for oil, I. N. Hinderliter Whiffletree, D. Foley Whiffletree, S. Loomer Whiffletree, S. J. Conover Window wesher, G. Pirrung Wrench, J. G. & O. G. Johnson	211,9%5 215,125 215,125 215,125 215,125 215,104 215,104 215,104 215,104 215,115,102 215,115,102 215,105 215,105 215,105 215,105 215,125,128 215,001 215,128 215,001 215,128 215,001 215,128 215,001 215,105 215,003 215,004 215,003 215,005 21
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,031 215,031 215,103 215,103 215,103 215,103 215,103 215,103 215,182 214,980 215,182 215,980 215,182 215,075 215,132 215,033 8,703 215,144 215,038 8,703 215,144 215,058 215,056 215,056	Atwater	211,9%5 215,125 215,125 215,125 215,125 215,125 215,104 215,164 215,148 215,148 215,148 215,148 215,148 215,148 215,162 215,162 215,164 215,165 215,168 215,164 215,111 215,154 215,111 215,154 215,104 215,105 215,000 215,009 215,158 215,128
 Fence, J. W. Temby	215,183 215,108 215,166 215,066 215,066 215,066 215,07 215,07 215,07 215,103 215,103 215,103 215,103 215,102 215,078 215,162 215,078 215,022 215,078 215,022 215,078 215,022 215,077 215,150 215,077 215,150 215,077 215,084 215,078 215,097 215,084 215,097 215,084	Atwater	211,9%5 215,125 215,125 215,120 215,104 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,164 215,162 215,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevernann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach. Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain drying kiln, C. W. Boynton (r). Grain from cars, unloading, T. L. Clark. Grain separator, J. H. Sturgeon. Grinding mill, middlings, J. Jones Gun lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hoisting machine, T. N. Davy. Folder fork, F. G. Butler. Hoe, A. J. Stone. Horsenke, C. R. Patterson Horseshoe Calk, G. K. Flower. Hot, W. M. Chittenden. Hub, vehicle wheel, N. P. Bowsher. Hydrant, E. A. Benson Lorence and cjector, steam, J. H. Itwin 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 215,009 215,182 214,980 8,702 8,692 215,069 215,160 215,078 215,162 215,063 8,703 215,073 215,073 215,077 215,072 215,077 215,102 215,077 215,072 215,075 215,	Alwater	211,9%5 215,125 215,125 215,125 215,125 215,130 215,143 215,143 215,143 215,143 215,143 215,143 215,143 215,143 215,162 215,136 215,136 215,136 215,137 215,138 215,13
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,031 215,108 215,031 215,103 215,103 215,103 215,103 215,102 8,692 214,980 215,182 214,980 215,182 215,045 215,132 215,033 8,703 215,144 215,038 215,045 215,077 215,154 215,077 215,156 215,058 215,056 215,057 21	Alwater Atwater Truck, bay, G. H. Smith Trunk bolt or eatel, O. D. Hunter Trunk, cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming Type writing machine, F. Deschamps Type writing machine, F. F. Warner Valve attachment, snfety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, stide and steam, A. H. Mathesius Valve, ent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles Violun, S. B. Sexton Wagon body, H. H. Richards Waster pipe attachment, H. W. Atwater Water cooler, G. H. Mettee Weits ruse classon, floating, K. Moller Weits tube clamp for oil, I. N. Hinderliter Whiffletree, S. Loomer Whiffletree, S. Falden Wind wheel, S. E. Alden Wind wwentilator, J. A. Conover Window ventilator, J. Hewson Bitters Sievert & Hios	211,9%5 215,125 215,125 215,125 215,125 215,125 215,104 215,164 215,164 215,164 215,162 215,162 215,162 215,162 215,162 215,162 215,162 215,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber . Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain for ears, unloading, T. L. Clark. Grain meter, E. Reisert. Grain no ears, unloading, J. Jones. Gun lock, W. M. Scott. Harwester, S. W. Moore. Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat seat lining, S. Beatty Hat seat lining, S. Beatty Hoe, A. J. Stone Hoising machine, T. N. Davey. Holback, vehicle, H. F. Morse. Horsenbee Calk, G. K. Flower. Hot air furnace, H. M. Chittenden. Hub, vehicle wheel, N. P. Bowsher. Hydrank, E. A. Benson. Ice planer, E. D. Haley Injector and ejector, steam, J. H. Irwin Jewelry, manufacture of, G. H. Faller. Key board instrument, self-playing attachment 	215,183 215,183 215,166 215,066 215,066 215,066 215,07 215,07 215,103 214,995 215,103 215,17 8,695 215,07 215,17 215,17 215,17 215,17 215,07 215,07 215,02 215,07 215,160 215,07 215,160 215,07 215,17 215,07	Atwater	211,9%5 215,125 215,125 215,120 215,104 215,164 215,163 215,164 215,163 215,164 215,164 215,162 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,145 215,154 215,150 215,15
 Fence, J. W. Temby. Filter press, A. Drevernann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach. Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain drying kiln, C. W. Boynton (r). Grain from cars, unloading, T. L. Clark. Grain from cars, unloading, J. Jones. Genn lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat see at lining, S. Beatty Ilay tedder fork, F. G. Butler. Hoe, A. J. Stone. Horsenke, C. R. Patterson Horsenke, C. R. Patterson Horsenke, C. R. Patterson Horsenke, C. M. Shower. Horsenke, C. R. Patterson Horsenke, C. M. Bowsher. Hydrant, E. A. Benson Lice planer, F. D. Haley Injector and ejector, steam, J. H. Irwin Jewelry, manufacture of, G. H. Fuller. Key board instrument, self-playing attachment for, E. F. O'Neill 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 215,009 215,182 214,980 8,702 8,692 215,069 215,182 214,980 215,160 215,078 215,078 215,033 8,703 215,150 215,084 215,162 215,084 215,126	Atwater	211,9%5 215,125 215,125 215,125 215,125 215,125 215,130 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,162 215,162 215,164 215,125,128 215,104 215,151 215,128 215,104 215,151 215,128 215,104 215,151 215,104 215,151 215,030 215,152 215,035 215,036 215,128 21
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,066 215,031 215,103 215,103 215,103 215,103 215,103 215,103 215,182 214,980 215,182 215,182 215,182 215,182 215,182 215,182 215,073 215,132 215,033 8,703 215,144 215,035 215,077 215,192 215,077 215,108 215,078	Alwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk, cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming. Type writing machine, F. Deschamps Type writing machine, F. Beschamps Valve attachment, safety, H. G. Asbton. Valve, slide and steam, A. H. Mathesius. Valve, selide and steam, A. H. Mathesius. Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle scat back and shifting rail, S. B. Cox. Veneer, wood, A. B. Rice. Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles Violin, S. B. Sexton Wagon body, H. H. Richards. Washing machine, J. C. Merritt. Waste pipe attachment, H. W. Atwater. Weather vane, E. S. Turner. Weir or caisson, floating, K. Moller Weils, tube clamp for oil, I. N. Hinderliter. Wheel supp-rung device, automatic idle, E. D. Olin Whiffictree, D. Foley Wind wheel, S. E. Alden Wind wheel, S. E. Alden Window wentilator, J. A. Conover Window washer, G. Pirrung. Window washer, G. Pirrung. Window washer, G. Pirrung. Window ventilator, J. A. Conover Window washer, G. Pirrung. Window ventilator, J. A. Conover Mindow ventilator, J. Hewson Bitters, Siegert & Hijos. Cigars, R. Leidersdorf & Co. Cigars, Krobn. Feiss & Co.	211,9%5 215,125 215,125 215,125 215,120 215,104 215,164 215,163 215,144 215,163 215,144 215,162 215,162 215,162 215,162 215,162 215,162 215,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain drying klin, C. W. Boynton (r). Grain neter, E. Reisert. Grain separator, J. H. Sturgeon. Grinding mill, middlings, J. Jones. Gun lock, W. M. Scott. Harvester, S. W. Moore Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat sweat lining, S. Beatty Hoisting machine, T. N. Davey. Holdback, vehicle, H. F. Morse. Horsenke calk, G. K. Flower. Hot air furnace, H. M. Chittenden. Hub, vehicle wheel, N. P. Bowsher. Hydrane, E. A. Brason. Ice planer, E. D. Haley Injector and cjector, steam, J. H. Irwin Jewelry, manufacture of, G. H. Fuller. Key board instrument, self-playing attachment for, E. F. Wiell. 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 215,009 215,182 214,980 8,692 215,045 215,05 215,078 215,160 215,078 215,160 215,078 215,163 215,174 215,085 215,092 215,008 215,108 215,097 215,008 215,097 215,008 215,008 215,008 215,113 215,126 215,013 215,028 215,009 215,150 215,008 215,150 215,008 215,113 215,155 215,015 215,015 2	Atwater	211,9%5 215,125 215,125 215,125 215,120 215,104 215,164 215,163 215,164 215,16
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach. Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber. Grain binder, Baker & Withington (r). Grain drying kiln, C. W. Boynton (r). Grain drying kiln, C. W. Boynton (r). Grain from cars, unloading, T. L. Clark. Grain from cars, unloading, J. Jones. Genn lock, W. M. Scott. Harvester, G. H. Spaulding (r). Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hat see at lining, S. Beatty Hay tedder fork, F. G. Butler. Hoe, A. J. Stone. Horsenke, C. R. Patterson Horsenke, C. R. Patterson Horsenke, C. R. Patterson Horsenke, C. R. Patterson Horsenke, C. M. Bowsher. Hydrant, E. A. Benson Lice planer, F. D. Haley Injector and ejector, steam, J. H. Irwin Jewelry, manufacture of, G. H. Fuller. Key board instrument, self-playing attachment for, E. F. O'Neill. King bolts, series of dies for forming the heads of, R. R. Miller (r) Kitchen eabinet, C. Romine 	215,183 215,183 215,166 215,066 215,066 215,009 215,182 214,995 8,695 215,009 215,182 214,980 8,702 8,692 215,064 215,160 215,078 215,033 8,703 215,03 8,703 215,102 215,050 215,052 215,056 215,084 215,132 215,084 215,132 215,084 215,135 8,694 215,155 8,694 215,165	Atwater	211,9%5 215,125 215,125 215,125 215,125 215,125 215,130 215,142 215,143 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,142 215,144 215,145 215,14
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,066 215,031 215,103 215,103 215,103 215,103 215,103 215,103 215,102 8,692 215,160 215,182 215,192 215,073 215,132 215,033 8,703 215,144 215,035 215,077 215,172 215,077 215,172 215,077 215,108 215,077 215,108 215,077 215,108 215,077 215,108 215,077 215,108 215,077 215,108 215,077 215,108 215,078 215,078 215,078 215,084 215,084 215,155 215,052 215,052	Alwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk, cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming. Type writing machine, F. Deschamps Type writing machine, F. F. Warner. Valve attachment, snfety, H. G. Asbton. Valve, slide and steam, A. H. Mathesius. Valve, selide and steam, A. H. Mathesius. Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Valve, vent and check, F. Richardson Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vehicle spring, H. Gardiner. Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles Violin, S. B. Sexton Wagon body, H. H. Richards. Washing machine, J. C. Merritt. Waster pipe attachment, H. W. Atwater. Weather vane, E. S. Turner. Weir or caisson, floating, K. Moller Weels, tube clamp for oil, I. N. Hinderliter. Whiffietree, D. Foley Whiffietree, S. Loomer Whiffigj, H. V. Hartz. Wind wheel, S. E. Alden Window ventilator, J. A. Conover Window ventilator, J. Hewson Bitters, Siegert & Hijos. Cigars, Krobn. Feiss & Co. Cigars, Krobn. Feiss & Co. Cigars, Krobn. Feiss & Co. Cigarster and chewing tobacco. Good win & Co. Cigars, cigarettes, and chewing and smoking to biacco, J. Rauch. Network Science Scie	211,9%5 215,125 215,125 215,125 215,125 215,125 215,104 215,16
 Fence, J. W. Temby. Filter press, A. Drevermann. Fire escape, W. Royce. Fire kindler, R. & T. B. Monosmith. Fire place, C. L. Lefebure. Fish trap, H. Webb. Fluting machine, M. W. Boon. Folding clair, W. Dieffenbach Gasos, process and apparatus for generating compound. C. M. T. Du Motay (r). Gasoline burner, F. A. Lyman. Governor regulator, steam engine, L. C. Taber Grain binder, H. A. Adams. Grain binder, Baker & Withington (r). Grain drying klin, C. W. Boynton (r). Grain neter, E. Reisert. Grain separator, J. H. Sturgeon. Grinding mill, middlings, J. Jones. Gun lock, W. M. Scott. Harwester, S. W. Moore Hat bodies, etc., machine for felting and hardening, J. G. Meeker. Hoise, etc., Mc. B. Shoulding (r). Hat sweat lining, S. Boatty. Hay tedler fork, F. G. Butler. Hoe, A. J. Stone. Holdback, vehicle, H. F. Morse. Horsenkee calk, G. K. Flower. Hot air furnace, H. M. Chittenden. Hub, vehicle wheel, N. P. Bowsher. Hydranke, E. A. Brason. Ice planer, E. D. Haley Injector and ejector, steam, J. H. Irwin Jewelry, manufacture of, G. H. Faller. Key board instrument, self-playing attachment for, E. F. O'Neill. King polts, series of dies for forming the heads of, R. R. Miller (r). Kitchen eabinet, C. Romine. Knitting machine, J. L. Stellmann Knitting machine, J. L. Stellmann 	215,183 215,183 215,166 215,066 215,066 215,003 215,031 215,103 214,995 215,039 215,182 214,980 215,182 214,980 215,182 215,078 215,160 215,078 215,163 215,174 215,088 215,092 215,097 215,097 215,097 215,097 215,098 215,097 215,098 215,097 215,098 215,097 215,098 215,097 215,098 215,113 215,150 215,097 215,086 215,113 215,155 8,694 215,165 215,055 214,989	Alwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter. Trunk bolt or eatel, O. D. Hunter. Trunk bolt or eatel, O. D. Hunter. Trunk belt or eatel, O. D. Hunter. Trunk belt or eatel, O. D. Hunter. Type writing machine, P. Deming. Type writing machine, F. Deschamps Type writing machine, F. F. Warner. Valve attachment, safety, H. G. Asbton. Valve attachment, safety, H. G. Asbton. Valve, slide and steam, A. H. Mathesius. Valve, vent and check, F. Riebardson. Valve, vent and check, F. Riebardson. Vapor and gas burner, H. McConnell. Vehicle spring, H. Gardiner. Vehicle spring, H. B. Rice. Venser, wood, A. B. Rice. Venser, wood, A. B. Rice. Weessel for preventing the shifting of eargoes, marine, D. Knowles. Violin, S. B. Sexton Wagon body. H. H. Riehards. Waste pipe attachment, H. W. Atwater. Waste pipe attachment, H. W. Atwater. Waste cooler, G. I. Mettee	211,9%5 215,125 215,125 215,120 215,104 215,163 215,164 215,163 215,164 215,163 215,164 215,162 215,164 215,076 215,07
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,007 215,003 214,995 215,103 214,995 215,009 215,182 214,980 215,182 214,980 215,078 215,064 215,078 215,078 215,078 215,078 215,078 215,078 215,078 215,078 215,077 215,078 215,077 215,078 215,077 215,078 215,077 215,078 215,08	Atwater	211,9%5 215,125 215,125 215,125 215,125 215,125 215,130 215,142 215,143 215,142 215,142 215,144 215,145 215,144 215,145 215,14
 Fence, J. W. Temby	215,183 215,183 215,166 215,066 215,066 215,07 215,07 215,103 215,103 215,031 215,103 215,07 8,695 215,079 215,182 214,980 215,182 215,078 215,160 215,173 215,033 8,703 215,168 215,078 215,032 215,078 215,033 8,703 215,168 215,058 215,058 215,056 215,057 215,056	Atwater Atwater Truck, bay, G. H. Smith. Trunk bolt or eatel, O. D. Hunter Trunk, cleetro-magneticburglaralarm, A. W. Hall Turnstile register, F. O. Deschamps Type writing machine, P. Deming Type writing machine, F. Deschamps Type writing machine, F. Marner Valve attachment, snfety, H. G. Asbton Valve, slide and steam, A. H. Mathesius Valve, vent and check, F. Richardson Valve, wood, A. B. Rice Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vehicle spring, H. Gardiner Vessel for preventing the shifting of cargoes, ma- rine, D. Knowles Violin, S. B. Sexton Wagon body, H. H. Riehards Washing machine, J. C. Merritt Water cooler, G. H. Mettee Weather vane, E. S. Turner Weir or caisson, floating, K. Moller Weels tube clamp for oid, I. N. Hinderliter Wheel supperting device, automatic idle, K.D.Olin Whiffietree, D. Foley Wind wheel, S. E. Alden Wind will, T. Alsop Window ventilator, J. A. Conover Window ventilator, J. Hewson Bitters, Siegert & Hijos. Cigars, Krohn. Feiss & Co. Cigars, Krohn. Feiss & Co. Cigars, Krohn. Feiss & Co. Cigars, cigarettes, and chewing and smoking to bacco, J. Rauch. Camp chimneys and shades, Pubst & Arming	211,9%5 215,125 215,125 215,125 215,125 215,125 215,125 215,104 215,16

Metallic can, G, L, Merrill (r).....

Nailing machine, L. Goddu......

 olin, S. B. Sexton
 215,023

 agon body, H. H. Richards
 215,164

 ashing machine, J. C. Merritt.
 215,145
 ste pipe attachment, H. W. Atwater...... 214,982 ter cooler, G. H. Mettee 215,016 TRADE MARKS. tificial precious stones, Franklin Jewelry Co..... 7,266 ars, cigarettes, and chewing and smoking to-... 215.012 Leather working, edging tool for, Z. B. Putnam., 215,159 the like diseases. H. R. Stevens ... 7.265 Medicinal compound for the cure of pain and in-Measuring machine, rope, Simms & Porter...... 215,073 Medical compound, J. E. Kleber 215,135 8.700 DESIGNS. Muzzle, horse, P. F. Shumaker.... 215,172 Badge, L. L. Churchill...... 11,180

sufficient power to run a 56 inch circular saw in heavy
pine timber and 3 wood turning lathes at the same time?
A Not at proper speed. 3. Can I run a 24 inch burr
corn mill and 70 saw cotton gin at once? A. We think
not, to their full capacity. 4. What rate per minute
must I run my saw and grist mill in order to obtain the :
best results? A. Consult a good millwright, as it de-
pends upon the kind of work your mills are to do. 5.
Is a 5 foot driving wheel too large for 12 inch stroke?
A, No.

(37) A. B. B. writes: I have a mercurial barometer from which some of the mercury has been spilled. Will it indicate the changes in the weather correctly? A. No, it should be refilled. This you may do by inverting it, pouring in mercury, and jarring it to remove every particle of air.

(38) T. A. S. asks: 1. Would it not increase the power of an electro-magnet if, with a given battery power, I connected ground wires; connecting the - pole directly with the earth by one wire, and running the current from + pole to another ground wire after passing around the magnet? A. No. 2. Would a magnet made of % inch iron, the poles 3% inches long, wound with Nos. 20 or 21 wire, and connected with two cells Calladu battery, attract with much force at % inch from the

AND EACH BEARING THAT DAT	Е.
[Those marked (r) are reissued patents.]	Р
	P
Animal trap, R. Lynex 215	,140 I
Annunciator, C. W. Hubbard 215	,124 P
Axle box, car, D. Pinney 215	,021 1
Axle maker, carriage, C. Young (r)	,705 F
Bag fastener, J. J. Boyer 215	,087
Band cutter, wire, R. Conarroe 215	,100 Г
Basket, W. Schneider 21	,168 Г
Bed bottom, E. Johnson 21	5,130 F
Bed, crib, Bostwick & Riblet 215	040 P
Bedstead, wardrobe, E. Kiss 218	,134 1
Billiard cue tip, F. Kubn 21	5,061 I
Boot and shoe edge trimmer, J. D. Westgate 21	5,189 P
Boot and shoe heel stiffener, H. A. Thompson 21	5,184 P
Boot and shoe nailer, L. Goddu 21	5,116 F
Boot strap, W. Smith 215	5.174 T
Boots and shoes, making, J. Hobart 218	059 1
Boots and shoes, making, W. R. Miller 215	,147 Г
Bottle stopper and fastener, C. S. Thompson 21	5.079 I
Bottle stopper, internal, Barrett & Bailey 21	,987 F
Box fastener, J. L. Stevens 21	5,179 H
Brazing, process of, W. Mason 21	5 OLS 1
Bretzel machine, Lampert & Huber 21	5,006 T
Broom handle striper, S. Lang 21.	5,137 F
Brush, D. White	5,032
Button, R. Bruel 21	5.042 I
Calendar, W. H. Cars	5,094

	Nailing machine, L. Goddu	Fireman's hats E Cairns 11 12
	Non-conducting platform design, H. L. Palmer (r) 8,697	Fort of printing types A Tittle 11 195
	Nozzle. variable exhaust, Congdon & Wood 214,992	Font of printing types, A. Intile
	Outlet pipe for sinks, etc., II. W. Atwater 214,983	Group of statuery I Pogore 11 199
	Oven, baker's, G. Brake	Trimming P Wornen 11 106
	Packing ring for piston heads, J. Harper 215,121	Timming, R. Weiner
I	Painting wire cloth, machine for, J. H. De Witt., 214,994	Inhrolle tin onn F Untrem
5,140	Paper bag holder, W. H. Donty 215.049	Chierena up cup, is, i utnam
5,124	Paper boxes, construction of, T. W. Dowling 215,196	
,021	Paper feeding machine, C. Ellery 215,051	English Patents Issued to Americans
3,705	Paper, machine for making wood pulp for, R. D.	Inghal Farmer Isance to Americans,
6,087	Mossman (r)	From May 9 to May 13, inclusive.
5,100	Paper sheets, machine for feeding, L. Harlow 215,058	Boot nailing machine, L. Goddu, Winchester, Mass.
5,168	Pianoforte agraffe, C. W. Brewer 215,089	Checks, preventing alteration of, G. C. McEwen, New
5,130	Picture frame, R. Hill 215,123	York city.
5,040	Picture nail head, J. J. Laughlin 215 007	Clothes hanger, European and United States Patent
5,134	Pipe coupling, W. Coler 214,991	Exchange, New York city.
5,061	Plow beam, W. J. Ball 214,986	Firearms, J. P. Lee, Ilion, N. Y.
5,189	Potato digger, R. W. Gates 215,115	Furnace for steam boilers, W. E. Kelly, New Bruns-
5,184	Printed fabric steamer, J. Smith 215,173	wick, N. J.
5,116	Printing press, oscillating, H. A. Manley 215 011	Gun barrels, brazing, Colt's Patent Firearms Manufac-
5.174	Projectile, L. A. Merriam	turing Company, Hartford, Conn.
5.059	Pulley, loose, M. B. Webster 215,188	Lamps, W. B. Robins, Covington, Ky.
5,147	Pump, direct-acting, H. Strater, Jr 215 026	Lubricating machinery, C. Pershall, Detroit, Mich.
5.079	Pump, double-acting, II. T. Drain 215,107	●re separator, C. M. Bucl, New York city.
1,987	Pump, double-acting, Seymour & Chamberlain. 2:5170	Railway, H. Reese et al., Baltimore, Md.
5,179	Pump, force, D . B. Hiser	Railway switch, H. Greenway, Brooklyn, N. Y.
5 013	Pump rods, adjustable clamp for, A. Wallace 215,030	Refrigerating apparatus, J. G. Wolf, New York city.
5,008	Pumps, waste valve for, P. A. Peer 215,156	Rotary engines. E. Hall, Boston, Mass.
5,137	Rack for supporting articles over lamps for heat-	Seed planter, J. Ellis, Oakland, Ga.
5,032	ing, I. W. Stiles	Sewer connections. W. Pickhardt, New York city.
5,042	Railway rails, roll for utilizing the fag ends of	Steam engine lubricator, W. P. Phillips, Boston, Mass
5.094	steel, M. McDowell	Water meters, W. B. Mounteney, Chicago, III.

, 215,117