TO INVENTORS.

An experience of more than thirty years, and the preparation of not less than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. In addition to our facilities for preparing drawings and specifications quickly, the applicant can rest assured that his case will be filed in the Patent Office without delay. Every application, in which the fees have been paid, is sent complete—including the model—to the Patent Office the same day the papers are signed at our office, or received by mail, so there is no delay in filing the case, a complaint we often hear from other sources. Another advantage to the inventor in securing his patent through the Scientific American Patent Agency, it insures a special notice of the invention in the SCIENTIFIC AMERICAN, which publication often opens negotiations for the sale of the patent or manufacture of the article. A synopsis of the patent laws in foreign countries may be found on another page, and persons contemplating the securing of patents abroad are invited to write to this office for prices, which have been reduced in accordance with the times, and our perfected facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN.

Business and Personal.

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.

At auction, January 21.—A complete Sewing Machine Manufactory. Fine machinery, special tools, patents, stock, machines. Catalogues ready. Call at 416 W. 14th St. N. Y.

Valves and Hydrants, warranted to give perfect satisfaction. Chapman Valve Manuf. Co., Boston, Mass.

Nickel Plating.—Wenzel's Patent Perforated Carbon Box Anode for holding Grain Nickel.

H. Prentiss & Company, 14 Dey St., N. Y., Manufs. Taps Dies, Screw Plates, Reamers, etc. Send for list.

Wanted—Good 2d hand Brussels Carpet Looms. Address, with particulars and price, P. O. Box 1772, N. Y.

Jarvis Patent Boiler Setting, same principle as the Siemens process for making steel; burns screenings and all kinds of waste fuel, without blower. A. F. Upton, Agent, 48 Congress St., Boston, Mass.

Save your Fuel.—From one-fifth to one-third of the usual amount of coal bills can be saved by the use of fireproof non-conducting Asbestos Coverings on hot air and steam pipes, boilers, heater pipes in dwellings, etc. The genuine can be procured only of The H. W. Johns Manufacturing Company, 87 Maiden Lane, New York, patentees and manufacturers of Asbestos Paints, Roofing, etc.

Best Power Punching Presses in the world. Highest Centennial Award. A. H. Merriman, W. Meriden, Conn.

Needle Pointed Iron, Brass, and Steel Wire for all purposes. W. Crabb, Newark, N. J.

Wanted.—Proposals for the manufacture of a Combination Tool, 12 inches long, part tempered steel. Address "Patent," P. O. Box 63, Baltimore, Md.

Nickel Platers and Manufacturers use Bunnell's New Nickel Solution, warranted to be no infringement upon any patent. Its low cost, easy, rapid action, white and beautiful deposit on iron, brass, copper, etc., commend it as the best working solution yet produced. Materials for solution, which is easily made, together with prices, etc., furnished upon application. J. H. Bunnell, Electrician, 112 Liberty St., New York.

Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son, 212 Chestnut St., Phila., Pa.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Sci. Am.; a full set for sale. A. F. Park, Troy, N. Y.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Bl'k's, Mech's, Ma'fs., address Box 73, Willimantic, Ct.

For Sale.—Brown & Sharp Universal Milling Machine; Bement Profiling Machine; first-class 2d hand Machine Tools. E. P. Bullard, 14 Dey St., N. Y.

Send for circulars of Indestructible Boot and Shoe Soles to H. C. Goodrich, 40 Hoyne Ave., Chicago, Ill.

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N.J.

1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.

Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N. Y., (Evening Post Building, room 22.)

Manufacturers of Type Making Machinery. Address, with circulars, John Pim, Erie, Pa.

Brush Electric Light.—20 lights from one machine. Latest & best light. Telegraph Supply Co., Cleveland, O.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.

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

Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.

Bolt Forging Machine & Power Hammers a specialty. Send for circulars. Forsaith & Co. Manchester, N. H.

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.

Bevins & Co.'s Hydraulic Elevator. Great power, simplicity, safety, economy, durability. 94 Liberty St. N.Y.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, $350. Forsaith & Co., Manchester, N. H.

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

Inventors' Models. John Ruthven, Cincinnati, O.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Pulverizing Mills for all hard substances and grinding purposes. Walker Bros. & Co., 23d & Wood St., Phila., Pa.

Howard Patent Safety Elevators. Howard Iron Works, Buffalo, N. Y.

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bentel, Margedant & Co., Hamilton, Ohio, at lowest prices.

Steel Castings true to pattern, of superior strength and durability. Gearing of all kinds. Hydraulic cylinders, crank shafts, cross heads, connecting rods, and machinery castings of every description. For price list and circular, address Chester Steel Castings Company, Evelina St., Philadelphia, Pa.

Machine Diamonds, J. Dickinson, 64 Nassau St., N.Y.

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

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

Sir Henry Halford says Vanity Fair Smoking Tobacco has no equal. Received highest award at Paris, 1878.

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

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Pittsburgh Steel Casting Company, Pittsburgh, Pa.

Self-feeding upright Drilling Machine of superior construction. Drills holes from ⅛ to ⅞ in. diameter. Pratt & Whitney Co., Manufs., Hartford, Conn.

The Lambertville Iron Works, Lambertville, N. J., build superior Engines and Boilers at bottom prices.

NEW BOOKS AND PUBLICATIONS.

DIE TECHNOLOGIE DER WIRKEREI, FUR TECHNISCHE LEHRANSTALTEN UND ZUM SELBSTUNTERRICHT. Leipzig: Arthur Felix. 2 vols. 8vo.

In this work, the author, Mr. G. Willkomm, Director of the College of Textile Industry, in Limbach, near Chemnitz, Saxony, has laid down the experience of a life of practical labor and theoretical study. Part I., which appeared in 1875, treats of the elements of knitting, looping, embroidering, etc., as well as of the more simple machinery and appliances used in handworking. Of great practical value is the second chapter, which gives a detailed description of all goods of this character occurring in the market and their relative value. A brief sketch refers to the early history of that branch of textile industry. Part II., just issued, treats principally of weaving machinery, describing about one hundred of the best machines now in use in Europe and the United States. The illustrations are very carefully executed, some of the smaller parts of the machinery being shown two or three times their natural size. For each illustration the exact proportions are given. There are 24 large plates, containing not less than 550 illustrations. Great pains have been taken by the author to add to all the tecbnical terms in German the corresponding expressions in English and French. This feature will make the book valuable to those who, possessing only a superficial knowledge of the language, are not acquainted with German technical terms. A special index connects the drawings with the corresponding passages in the text. On the whole, the book will be found of great value as a handbook for the manufacturer and mechanical engineer, and also as a text book for the student of textile mechanics.

SAW AND PLANING MILL DIRECTORY OF THE UNITED STATES AND CAÑADAS. Milwaukee, Wis.: Publication Office of the *United States Miller*. $5.

A useful directory giving the names of all the sawmills and planing mills in the United States, Canada, New Brunswick, etc., with the names of their owners.

The publishers of the *Miller* have also issued a similar directory of the flour mill owners of the United States and the Canadian Dominion.

Notes & Queries

(1) H. M. P. asks how to prepare artists' canvas. A. Dampen the canvas, tack it on the stretcher, apply a thin coating of starch sizing, when dry apply thick paint of the desired tint.

(2) G. B. asks: 1. Why is it that a wagon wheel travels faster at the top than at the bottom when running along the ground? A. See p. 394, issue of December 21 last. 2. What gases have not been liquefied by any means? A. MM. Pictet and Cailletet have recently succeeded in liquefying all of the so-called permanent gases. See pp. 64, 71, 73, 111, 147, and 186, vol. 38, SCIENTIFIC AMERICAN. 3. If sulphuric acid be poured into a jar containing strong nitric acid, will there be an explosion? A. No, the acids should, however, be mixed gradually to avoid overheating, which would otherwise occur. 4. What is the composition of gun cotton? A. According to the best chemical analysis, gun cotton is trinitro-cellulose ($C_6H_7(NO_2)_3O_5$), consequently it is cotton considered in a pure state as cellulose, $C_6H_{10}O_5$, 3 atoms of the hydrogen of which have been replaced by 3 atoms of hyponitric acid. 100 parts of gun cotton contain: Carbon, 24·24; hydrogen, 2·36; oxygen, 59·26; nitrogen, 14·14; total, 100.00.

(3) L. R. asks: What would remove stains of olive oil from glazed printed paper? A. Moisten the spots with benzole and cover immediately with warm, dry pipe clay for a time. Repeat this treatment several times if necessary, using pressure,

(4) L. C. S. asks: What would make a good cement or paste for fastening gum covering on an iron roller? A. Melt together in an iron vessel over a gentle fire, pitch and guttapercha in about equal parts; use hot, but not too hot.

(5) C. S, asks (1) for a good remedy for weak eyes. A. Better consult a good physician. 2. Does wood dust cause the eyes to get weak? A. Yes, under some circumstances.

(6) H. G. C asks for a recipe for making a prepared marking ink, such as is used by the drygoods stores in writing show cards and marking boxes. A. A concentrated solution of the soluble aniline black in water makes an excellent ink for this purpose. Use hot water to make the solution.

(7) S. D. M.—The curious hairlike substance is similar to the mineral wool now largely made from molten blast furnace slag by contact with a jet of hotair or steam.

(8) A. J. L. asks for list of books on both theoretical and practical chemistry, for one who is about to enter the study of chemistry to become an analytical chemist. A. The following are among the best: Theoretical Chemistry—Remsen, Cooke, and Hofmann. Inorganic Chemistry—Wohler, Gorup-Besanez, and Miller. Organic Chemistry—Fittig's edition of Wohler's Organic Chemistry, and A. Butterow. Analytical Chemistry—Fresenius' Qualitative and Quantitative, Eliot and Storer, H. Will, and Thorpe.

(9) F. N. (Beyrout, Syria).—The sample of thread is sized with tapioca starch and glazed in the finishing machine. Your other inquiries will be referred to subsequently.

(10) W. P. asks: Can you tell me the object of putting sal ammoniac in the packing, or iron scales, which surround the castings to be annealed in malleable iron? A. The ammonium chloride is added to the castings after annealing and while still hot to rerust the hematite and magnetic oxide of iron used, so that they can be used again. It has nothing to do with the malleability of the castings. The whole process is described in "A Practical Treatise on Casting," pp. 281-289.

(11) A. K. asks: 1. What are the materials used to make oxygen gas by the generator shown on p. 42, vol. 39? A. The apparatus is not used for the manufacture of oxygen. 2. Can carbonic acid gas be made by the same process? A. Use small lumps of marble and hydrochloric or sulphuric acid diluted with two or three volumes of water.

(12) M. S. P.—It is the strained and dried jelly of Irish or Carrageen moss (*Chondrus crispus*). The jelly is prepared by boiling the dry moss in water.

(13) J. Q. asks what are the uses of sodium (metallic) and aluminum, also of the demand for them in the American markets. A. Sodium is chiefly used as a reducing agent in some metallurgical operations, as in the separation of aluminum and magnesium from their ores. It is also used in Crooke's silver amalgamation process, and occasionally in the reduction and purification of zinc, and in certain chemical operations. It is quoted in New York at $0.65 per ounce. Aluminum is principally used for small weight, light tubes for optical instruments, also to some extent for surgical instruments and appliances, and for the production of aluminum bronze, for bells, etc. It sells for $1.30 in New York. The market for both of these metals is very limited.

(14) "Reader" asks what is meant by so many parts of this or that in the receipts given in the SCIENTIFIC AMERICAN. A. A part is a unit of quantity; for example, it may be weight, as so many pounds or ounces, or it may be measure, so many gallons, quarts, pints, or ounces.

(15) H. G. A. writes: Suppose I place an engine in position for the forward stroke, and move it until the crosshead is at half stroke, does the crank stand 90° from the dead center line? If not can you explain why not? A. It does not, on account of the angularity of the connecting rod. You will find the matter fully explained in Auchincloss' "Link and Valve Motions."

(16) W. V. asks (1) for a receipt for recutting files with acid. A. Dip them for a short time in dilute sulphuricacid. 2. Can you tell me what the tolu sold in drugstores is made of? A. Tolu, or balsam of tolu, is an exudation from incisions in the bark of *Myroxylon toluifera;* it closely resembles balsam of Peru, but is more susceptible of resinification. Old hard balsam of tolu is a convenient source of cinnamic acid, which is extracted by the same process as that by which benzoic acid is obtained from benzoin, namely, ebullition with alkali, filtration, and precipitation with hydrochloric acid. 3. How is paraffine extracted from coal tar? A. It would require too much space to describe the process here; you will find a comprehensive article on the subject in Wagner's Chemical Technology, pp. 588-593.

(17) H. W. asks: Would the lenses of a camera answer for an object glass for a telescope? A. Yes, but not so well as lenses of a longer focus.

(18) M. A. N. writes: 1. I am making a phonograph, have made the shaft ¾ inch diameter, thread cut on 5 inches in length, 10 threads to inch; would an iron cylinder give better results than a plaster of Paris one? A. Yes. 2. How deep must the thread be cut on the cylinder? A. 1/15 inch or more.

(19) J. E. F. says: I should like to know of some remedy for the prevention of sweat on show windows, especially visible after the gas has been lighted. A. To prevent the condensation of moisture on show window glasses, the interior of the show window should have free communication, top and bottom, with the external air. If the air within the show window is kept nearly as cold as the external air, no condensation will take place.

(20) T. C. asks: 1. What is the difference between an ordinary induction coil and a Ruhmkorff coil? A. The difference lies in the perfection of the insulation, the employment of a condenser, and a somewhat different mode of winding. See how to make induction coils in SCIENTIFIC AMERICAN SUPPLEMENT, No. 160. 2. How is the coil constructed that is used to increase the current in a telephone, and how is it connected with the telephone? A. The induction coil described on p. 203 (14), vol. 39 of the SCIENTIFIC AMERICAN will answer; place the transmitter in the primary circuit and the receiver in the secondary. 3. Am I right in saying that there is no current induced in the secoudary coil unless the primary circuit is broken. A. The current in the primary wire acts inductively on the secondary wire whenever it is opened or closed or varied in intensity or quantity.

(21) W. S. C. asks: How far will water fall in one second? A. About 16 1/12 feet.

(22) J. M. asks: Under the same conditions which of two steam radiators having the same exterior surface, will be the most effective, one having thick or thin sides? A. We think there will be a slight advantage in the case of the thin radiator.

(23) W. S. H.—The fact that a stone falls more rapidly than a feather, is due solely to the unequal resistance opposed by the air to the descent of these bodies. In a vacuum all bodies fall with equa rapidity.

(24) C. W. W. asks: 1. Is it not true that earthquakes are becoming less numerous? A. No. 2. Is it not acknowledged by our best scientists that the earth's crust, as we understand it, is growing thicker as time advances, and if possible give approximate ratio of increase or decrease? A. Savants consider the earth solid. 3. Where can I procure a work that will answer questions of a geological nature (like above)? A. Dana's *Manual*.

(25) "Subscriber" writes: I am building a boat 16 feet long, 30 inches wide at the bottom, is decked all over, but 6 feet long, 1½ feet wide through the middle, and 13 inches high; what I want is a sail that would suit it, and how large should it be? A. If you employ the usual cat rig, a safe sail would be about 12 feet long on the boom and 9 feet hoist.

(26) C. W. J. asks: What is the smallest power, in foot pounds, that will answer for the motor to drive a family sewing machine at work? A. About 1/10 of a horse power.

(27) A. M. asks: What diameter should the piston be for a piston blower for a furnace 6 inches in diameter and 16 inches to the top of the brick, what length of stroke, and at what speed should it be driven? A. Proportion it so that it can deliver about one cubic foot of air per minute.

(28) F. W. P. asks: From which does heat radiate the better, a smooth or a rough surface; in other words, which heats a room the quicker, a highly polished or a rusty, rough stove? A. Melloni's experiments show that a rough metallic plate is a better radiator than a polished one, other things being equal.

(29) M. M. asks: What is good to clean and polish the silver cases of watches? A. Well prepared rouge, or infusorial earth, rotten stone, tripoli, etc., are among the best. Well burnished silver requires no after polishing.

(30) Charley asks for directions for making a small horizontal steam engine. A. It would be well for you to copy some style of large engine, making your selection from the numerous illustrations in the back numbers of the SCIENTIFIC AMERICAN. You can buy nearly all the working parts, ready to put together. See our advertising columns.

(31) C. C. W. and others.—The principal difficulty with phonographs made by amateurs lies in the damping of the diaphragm. In some instances, the diaphragm is so thoroughly damped as to almost entirely prevent vibration; while in other cases the diaphragm is almost as free to vibrate as if no attempt at damping had been made. It is difficult to give directions that would apply in all cases; we therefore recommend experiment. The best size of needle is the common carpet needle, and the needle spring should be fully as heavy as represented in the drawings accompanying the directions for making a phonograph contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 133. Make your needle spring like that in the drawings; if it is a little stronger it will do no harm. Carefully adjust the damping of the diaphragm, and speak very loudly and distinctly into the mouthpiece.

(32) F. W. T. asks: 1. Can I make an electric light with 30 cells of Callaud's gravity battery? A. No. 2. If not, what form of battery is best? A. Grove's or Bunsen's. 3. What lamp is best to use? A. There are a number of lamps which seem to be equally good. 4 I have a chemical laboratory at command as well as machinists' tools. Can I make the lamp illustrated in last SCIENTIFIC AMERICAN, the Sawyer-Man lamp, from drawing and description there given? A. We think so. 5. If not, is there some form of lamp more easily constructed, and where is it described? A. The Werdermann, described on p. 373, vol. 39, of SCIENTIFIC AMERICAN. 6. I have made a phonograph, from drawings in No. 133 of SCIENTIFIC AMERICAN SUPPLEMENT, which is not quite satisfactory. I send needle and sample of foil; can you suggest the difficulty? I have followed drawings given. A. Needle not sharp enough. See reply to C. C. W. and others on this page. 7. In making a microphone I have used carbon that had been used in a battery. Does it make any difference, or must I have new carbons for that purpose? A. We think the carbon will do, but it should be soaked in warm water for a time. 8. Of what material are the carbon holders and diaphragms in the Sawyer-Man lamp? A. Carbon.

(33) G. M. asks how to insulate wire for magnets and other uses? A. A coating of thick shellac varnish will answer if the wire is wound before it becomes so thoroughly dry as to crack on bending the wire; it is better, however, to wind the wire with silk or cotton.

(34) M. G. W.—SCIENTIFIC AMERICAN SUPPLEMENTS Nos. 94 and 98 treat on warming and ventilation.

(35) A. B. asks: 1. How can I make a simple and cheap electric battery? A. See SCIENTIFIC AMERICAN SUPPLEMENT No. 157. 2. Can a galvanic chain or belt be made? If so, how? A. By connecting together alternating plates of zinc and copper.

(36) J. J. F.—For cement recipes, see SCIENTIFIC AMERICAN SUPPLEMENT No. 158.

(37) R. M. asks if emery is porous. A. Emery is corundum of black or grayish black color, and contains magnetite or hematite intimately mixed. There are gradations from the evenly fine grained emery to the kinds in which the corundum is in distinct crystals. It cannot be considered a porous body.

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(38) "Dairy."—For description of the process of making artificial butter, see SCIENTIFIC AMERICAN SUPPLEMENTS Nos. 48 and 49.

(39) G. H. L. writes: I am having a sail boat built 32 feet overall, about 26 feet keel, and 12 feet beam, 15 to 18 inches draught of water. 1. Would it be too large for a cat rig? A. We know of cat boats of the size you state. 2. If not too large for a cat rig, what should be the dimensions of the sail, boom, gaff, and hoist? A. Boom, 32 feet, hoist, 23 feet, peak, 35 feet high in a vertical line.

(40) W. B. K. asks: Can you give me the numbers of the SCIENTIFIC AMERICAN that have the receipts for making matches? A. Waterproof matches, vol. xxxiv., p. 251; safety matches, vol. xxxv., p. 379; composition matches, xxxvii., p. 315, of the SCIENTIFIC AMERICAN.

(41) G. M. G. asks: Do the apparent changes in the moon, namely, new moon, first quarter, full moon, and third quarter, produce any visible change in the condition of the weather, such as to cause storms or to prevent them? A. The question has never been absolutely settled: the weight of evidence, however, is rather against the doctrine that the weather is measurably influenced by the phases of the moon.

(42) J. S. asks: 1. What is the horse power of a locomotive boiler having a fire box 36x24 inches, number of flues 28, size of flues, 3 inches, length of same 6 feet, shell outside diameter, 30 inches? A. There is no standard rule for estimating the horse power of a boiler. 2. One of the flues leaked, and the flue sheet appears thin below the lower flues. Size of flue sheet at thin place, one eighth to three sixteenths inch, space 4 inches, tested with cold water hydrostatic pressure to 90 lbs. to the square inch. Am I safe to run from 45 to 50 lbs. per square inch? A. We think so, if you have stopped the leak.

(43) W. E. C. writes: I wish to make a thermometer with an open end. Can I take an ordinary glass tube not blown out into a bulb, fill this with mercury, and use it as a thermometer? I wish the open end for making a register. What makes the difference in different sized thermometers—the size of the tube or height of the mercury? I would like to have the mercury size 1 inch to 5 degrees. A. Yes, but the tube would require to be very long. The mean coefficient of expansion for temperatures between the freezing and boiling points for pure mercury is 0·00010085 for each degree Fahrenheit—that is, it expands about 1-9916 its volume for each degree increase of temperature. From this datum the size of tube and amount of mercury required may be readily ascertained. The rate of expansion in thermometer tubes is increased by making the bulb or reservoir larger, or the bore of the tube smaller in proportion. For large thermometers the bulb reservoirs will not answer, as much time is required for the large body of mercury to assume the temperature of surrounding bodies. In its place the tube is usually wound closely upon itself in the form of a spiral.

(43) D. J. T. O. asks: Is there any way to bore a hole through a circular piece of plate glass, for a plate electrical machine? I have tried a bow drill with no effect. A. Use a copper tube in place of the drill, and keep it charged with emery and water.

(44) F. W. M. asks if increasing the strength of the magnets in a telephone will increase the volume of sound. A. It has been determined that there is a maximum strength for telephone magnets beyond which nothing is gained by using larger or stronger magnets.

(45) A. W. E. asks: 1. How much weight will a permanent magnet, 2 inches x 3-16 inch, hold up? A. It depends much upon its temper, form, and magnetization. 2. Would two fastened together be twice as strong, or should there be a space between? A. As we understand you, no; but a magnet formed by a number of thin magnets joined, like poles together, presents a much stronger magnetic field than a solid bar of the same weight under like conditions. You will find a description of a powerful magnet of this kind, invented by M. Jamin, on pp. 227–232, *Sciences Record*, 1874. 3. Can an electro-magnet have more power than a permanent magnet of the same size? A. Yes, much greater. 4. How can I make an explosive that will adhere to paper and explode by tearing the paper through it. Would it be better to add a few grains of sand? A. Reduce separately, by trituration, 4 parts of potassium chlorate, and 1 part of amorphous (red) phosphorus to powder. Moisten with water, cautiously mix the ingredients together, in small quantities at a time, and dry at a very gentle heat. Coat the paper with glue and a little sharp quartz sand. Another explosive mixture is prepared in a similar manner from 16 parts potassium chlorate, 8 parts black antimony sulphide, 4 parts flour of sulphur, and 1 part charcoal, moistened with gum or sugar water.

(47) H. C. B. asks for a receipt for making a cheap airtight and waterproof cloth. A. Boiled oil, 5 parts; wax, 1 part; turpentine, q. s., to form a uniform sirupy varnish. Through this slowly pass the cloth, first thoroughly dried and moistened with turpentine. Press out excess between weighted rollers.

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

J. S. L.—The sample of clay is nearly free from iron, but contains a small quantity of lime, magnesia, and silica. If properly washed it may prove of some value for the manufacture of fine pottery, etc.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

On Small Steamboats. By D. L.
Secret of the Whitehead Torpedo. By I. H. D.
On Flour Mill Explosions. By G. M.
On Electric Light. By A. G. H.

HINTS TO CORRESPONDENTS.

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 the page, or the number of the question.

Many of our correspondents make inquiries which cannot properly be answered in these columns. Such inquiries, if signed by initials only, are liable to be cast into the waste basket.

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.

[OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

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

November 26, 1878,

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, 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.

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