

**MYSTERIOUS VASE.**

BY W. B. CAULE.

Tricks performed with ink and water have always been favorites with magicians, and they have devised means of keeping this trick fully abreast of the times, thus retaining its popularity. The manner of performing the latest ink trick involves such novel principles as to puzzle even those who are well posted on modern magic. The Mysterious Vase has been presented by but few prestidigitators, and the secret so well guarded that comparatively few people know how it is done.

The attention of the audience is called to a glass vase that is filled with water which is resting on a light stand. This vase resembles a large octagon celery glass. In the vase there are a few cut flowers, which the performer removes as he calls attention to the vase and the clear water it contains. The flowers are given to the ladies in the audience, as they have no further connection with the trick.

A lady's handkerchief is borrowed and the vase covered with it for a moment. On removing the handkerchief, the water that was seen in the vase appears to have changed to ink. While this rapid transformation is very startling, yet the most marvelous part of the trick is to come. The magician bares his forearm, that the audience may see that his sleeves have no connection with the trick, and then proceeds to remove from the ink in the vase six silk handkerchiefs and two lighted candles, each article being perfectly dry.

The means by which this seeming impossibility is performed are as simple as the trick is mysterious, as the following will show. In the center of the vase, reaching from side to side and from the bottom to within a half inch of the top, is a piece of polished mirror. The side edges of the mirror rest in the angles of the vase, and as the vase is only seen from the front, the edges are not seen. The front half of the vase being reflected in the mirror leaves the impression that one is looking directly through the vase, when in reality you only see one-half of the inside.

To the back of this mirror is at-

tached a watertight tin box, in which are placed six small silk handkerchiefs and two candles. The exterior of the box and back of the mirror are painted a dead black color. Enough water is poured into the vase to reach the top edge of the mirror. In the water is dissolved a small portion of iron protosulphate. A few cut flowers are placed in the vase, which is then placed on the stand with the mirror side to the audience, and the candles lighted.

After the flowers are removed and a handkerchief borrowed, the magician secures possession of and palms between his fingers a small lozenge made of pyrogallie acid, which he drops in the water in front of the mirror in the act of covering the vase with the handkerchief. In a very few moments the lozenge dissolves, and the pyrogallie acid of which it is composed causes the water, which holds in solution the iron protosulphate, to change to a good black ink.

On removing the handkerchief with which the vase

was covered, ink is seen to have taken the place of the water, and from the center of the vase the performer removes the silk handkerchiefs and candles.

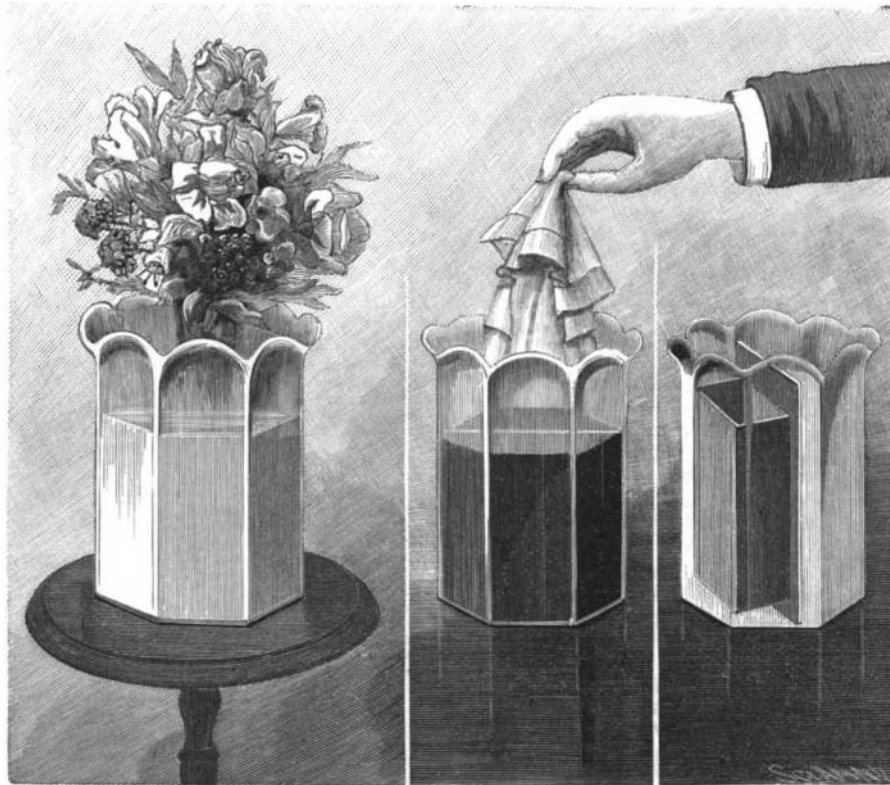
The first section of our engraving shows the vase of water on the stand; the second shows the vase after the water has changed to ink, with the magician removing one of the silk handkerchiefs. The third illustration represents the vase with one side broken away, showing attached to the back of the mirror the tin receptacle that contains the handkerchiefs and candles.

**The Value of Trade Marks.**

The trade mark is essential; it is a protection to the honest maker and a menace to the dishonest maker; it is a protection to the buyer, and he realizes it even to the extent of, in many instances, paying more for the article bearing it, perhaps after his merchant has assured him that "here is something as good, or better, for less."

Two articles may look alike as two peas, but offer them for sale at the same time and place, for the same price, one bearing a well-known trade mark, the other unmarked, and every time the marked one sells first. Why is it? Because, in this day and age, imitation and fraud has invaded every line of business, and the buyer must, to a greater or less extent, deal on faith; but he is not going wholly on faith if he can help it. A trade mark is a mark of identification that cannot be mistaken, even by the ignorant, and when once well and favorably known, its merits are explained by father to son, mother to daughter, and the high standing of the article bearing it assured so long as the manufacturer is careful to keep it up to the standard and fully abreast of the times.—Machinery.

MRS. TYNDALL, the widow of Prof. Tyndall, has remitted to the Royal Institution a sum of £1,000 which she states that her husband desired her, at such time as should be convenient to herself, to present as an expression of his attachment to the institution with which he was so long connected, and of his sympathy with its objects.



THE MYSTERIOUS VASE.

**RECENTLY PATENTED INVENTIONS.****Engineering.**

**STEAM ENGINE.**—William F. and Eugene W. Cleveland, Rounthwaite, Manitoba, Canada. This invention presents an improvement on a formerly patented invention of the same inventors, relating more particularly to a locomotive or tandem engine, whereby a greater or lesser vacuum is produced in the exhaust ends of the cylinder by an induction or suction action of the piston exhaust of one engine on the valve or auxiliary exhaust of the other engine. The two cylinders have their main or piston exhausts and auxiliary or valve exhausts so arranged that the main exhaust of one engine cylinder produces a suction on the auxiliary exhaust of the other cylinder. The larger exhaust area, with prompter action and without dividing the steam, increases the velocity of the latter, or it is less retarded and heavier draught is produced.

**ROTARY ENGINE.**—Martin C. Kessler, Gilead, Ind. This invention relates chiefly to the wear surfaces and packing of rotary engines, and provides improvements whereby leakage of steam is prevented. The rotary piston hub has radial and lengthwise slots in which the pistons proper are slidably arranged, while segmental packing pieces arranged at the ends of the hub have radial grooves to receive the ends of the pistons. Each piston is supported and forced outward by pressure applied at its center only, so that its outer or wearing surface may automatically adjust itself to the contact or friction surface of the casing with the greatest facility and exactness.

**RAILWAY WATER TANK.**—William M. Stevenson and William K. Bailey, Honey Grove, Tex. This invention provides a simple construction by means of which a railway train may be utilized to lift water from a well to the tank, a large upright tube or barrel extending down into the well, and there being over the barrel a derrick-like frame affording guides for a cross-head to which is connected a plunger operating in the barrel, there being a tackle block at the top of the derrick, and a pumping cable adapted to be connected with the locomotive. A wire or rod line is supported at the side of the track in both directions, to form a guide for the pumping cable, which has a link or ring sliding on the wire. When a train stops, going either way, the locomotive is connected with the cable, and the pumping is effected as the train starts, lifting the plunger and a column of water, the cable being detached by a tripper striking a post.

**Electrical.**

**ARC LAMP.**—Edgard Weber, Paris, France. According to this invention the carbon holders are connected by a cord or small chain, one holder being heavier than the other to actuate them, and the cord passing around a disk mounted loosely on the spindle of which are armatures connected with a mechanical brake acting on the disk, and submitted to the action of a spring or counterweight, an electro-magnet arranged in shunt on the main circuit. When the voltage increases at

the lamp terminals and the electro-magnet receives a proportional quantity of the current, the mechanical brake is released and magnetic braking is exerted upon the disk in such manner that the carbons approach each other slowly, regularly and without jerks, being slightly drawn back as soon as they have made contact.

**Bicycles, Etc.**

**BICYCLE FRAME.**—Amos R. Simonds, Youngstown, O. This invention provides novel means for establishing a spring connection between the frame and one of the axles, whereby the two may have a degree of independent movement, relieving the sides of jarring in riding over a rough road. Auxiliary frames are attached to the back stays and members of the rear fork, and admit of independent movement of the wheel in an arc struck from the crank axle, without interfering with the operation of the chain and sprocket driving gear.

**Mechanical.**

**SELF-OILING WHEEL.**—Ivor R. Titus and John W. Ensign, Huntington, W. Va. The wheel hub, according to this invention, is adapted to hold a quantity of oil in such a manner as to supply it to the bearing in sufficient quantity to properly lubricate the journal in the most economical manner. Means are also provided for the exclusion of dust from the journal, and for supplying oil without the removal of plugs and other devices, a better surface than the ordinary cotters being furnished to receive the wear on the end of the hub. The wheel may be quickly removed and replaced in case repairs are needed.

**AUTOMATIC LUBRICATOR.**—Alexander A. DeWitt, New York City. This lubricator is applicable to cylinders, pipes, chests and bearings of engines, its construction adapting it for use on a great range of machinery. It comprises a pump on the rod of which are two striking points or tappets, one movable relative to the other, an actuating cam revolving between the striking points, while a threaded rod mounted longitudinally on the piston rod engages and moves the adjustable striking point. The operator can govern the delivery of lubricating material to suit the machine with but little care and at the least possible cost for the lubricator.

**METHOD OF PATCHING SAWS.**—Michael D. Ahearn, Green Bay, Wis. To repair fractures in metal plates, according to this invention, the metal on one side is cut away directly across the line of the fracture, to form a lateral recess and reduce the edges of the fracture to a feather edge, a corresponding splice piece being then inlaid and brazed within the recess and across the fracture. The method is designed to insure a strong and permanent patch for the repair of broken, cracked or fractured mill and other saws or steel plates, or for the insertion of broken-out teeth, the crack having its edges so cut away that it does not have any tendency to creep to a greater depth, and the saws not being shortened.

**COMBINATION IMPLEMENT.**—Charles J. Ericson, Salt Lake City, Utah. An improved tool for mechanics is provided by this inventor, one adapted to

be readily changed in adjustment to serve as a square, a bevel gage, spacing dividers, and a pencil compass. Its stock piece is formed of sheet metal and has side pieces held together by an integral web, the sides having right-angular flanges in the same plane and terminating at one end in laterally perforated ears, one side having a pointed toe at the end opposite the ear.

**FLUID METER OR MOTOR.**—John H. Dixon, Marietta, O. This invention provides an apparatus in which a casing incloses a rotary shaft having paddles or blades against which the incoming fluid may act, the apparatus being so constructed that it may also be used in connection with a meter to record the amount of fluid passed through it, the latter being effected by a simple system of gears and dials which may be readily adjusted with reference to the known quantity of fluid passing through.

**KNIFE SHARPENER.**—John W. Mailot, New York City. According to this invention a pair of blocks is formed with complementary wavy surfaces which are brought close together and are composed of an abrading material, the knife to be sharpened being drawn lengthwise in the angle formed between these surfaces. The blocks may be formed as a single block or as two separate blocks held together by an inclosing frame, and they may be made of vitrified emery throughout, or of clay, cement, or other material readily shaped and cheaply manufactured, their outer curved surfaces being of emery or other abrading material.

**COLLAR FOLDING AND SHAPING MACHINE.**—Antoninus Farina, New York City. This invention provides a machine designed to expeditiously and effectively fold collars without injuring them, the machine folding and shaping turn-down and roll collars, and shaping the wings of wing collars. In addition to ironing and shaping the collar, the machine smoothes down any parts of the fiber which may project in a torn state, thus making the collar regular at its crease and preventing it from irritating the neck of the wearer.

**Miscellaneous.**

**RECOVERING ZINC OXIDES FROM SOLUTIONS OR ORES CONTAINING ZINC.**—Edgar A. Ashcroft, Newcastle, N. S. W. To obtain zinc oxide from ores or solutions containing zinc, in a cheaper and more convenient manner than heretofore, this inventor provides a process for first obtaining from the ore or solution solutions of zinc sulphate, adding zinc oxide and stirring the mixture until a pasty consistency is obtained, and heating the product to convert it into zinc oxide, sulphuric or sulphurous acid being disengaged. In neutral zinc solutions the zinc salt is first converted into basic zinc salt by the addition of zinc oxide, carbon being then intimately mixed with the basic zinc salt, and the mixture heated to about the melting point of aluminum.

**GAS LIGHTER.**—Thomas N. McNish, Kearney, N. J. This inventor has devised a hand gas lighter which consists of a stationary taper-receiving tube in connection with a revolvable key independent of the taper-carrying tube, and adapted to be operated by

the thumb of the hand grasping the handle of the device. The gas may be turned on and lighted without danger of marring or in any way injuring any ornamental work, and the device is simple and inexpensive.

**MANIFOLDING CASH SALES BOOK.**—John H. Murphy, New York City. This invention provides an improvement on a formerly patented invention of the same inventor, whereby the sales book or counter check book is arranged to enable the salesman or other person to quickly and conveniently produce three or more sales slips simultaneously. Each leaf of the book is formed into three or four separable slips or sections, the slips being folded over, and a corresponding number of transfer sheets being employed.

**COLLAPSIBLE BOX.**—Henry H. Kinsey, Shoshone, Idaho. This invention provides a novel construction of "knockdown" boxes for the transportation of eggs, bottled milk, crackers, etc., the box being also designed to serve as a convenience in the household when desired. The end pieces have detachable hinge connection with the bottom piece, and the side pieces engage slideways in the end pieces, while the cover has flanges which engage over the end pieces, and is secured in place by removable fastening devices.

**LACE OR RIBBON CABINET.**—Charles H. Martin, Marshall, Ill. For holding and displaying ribbons, laces and similar goods, this inventor has devised a cabinet which is divided centrally and the rear portion hinged to the front, so that it may be swung to the side, thus exposing the inner portions to facilitate the removal or replacing of goods. The two parts of the cabinet are secured together by a latch, and brackets are attached to horizontal bars extending across the front and rear faces, both faces of the cabinet, between the horizontal bars, having glass strips, making it possible to see the spools in the cabinet and ascertain when the stock becomes reduced.

**WAGON BRAKE.**—Joseph A. Gilkey, Springfield, Oregon. According to this invention, a spring adapted to be attached to the hounds or other fixed portion of the running gear is so made and located that it will take up all the slack in the brake and its coupling, and when the brake is not applied the spring will act to carry and hold the brake beam and shoes or blocks away from the wheels, preventing the accumulation of mud on the shoes or blocks. The spring also prevents the brake bar or beam from swinging endwise, but does not interfere in any manner with the action of the brake mechanism.

**GARDEN TOOL.**—Libbie B. Smith, Belle Plain, Iowa. This invention relates to improvements in hoes, rakes and diggers of various kinds, and provides a handle having an adjustable head, so that a number of different kinds of garden implements may be attached thereto, the head being so made that the various tools when attached may be adjusted and yet be retained in such position that the lower or operating points or parts will be level when the implement is held in position for use. Any form of garden tool may be made to be attached to this head.



**TAIL PIECE FOR MUSICAL INSTRUMENTS.**—Robert E. Lackner, Paragould, Ark. In stringed instruments, this invention provides means by which the tension of the strings may be readily increased or relaxed. The tail piece has two members connected by an eccentric with each other, whereby one of the members may be moved forward and rearward.

**COOKING APPARATUS.**—George D. Fox, Buffalo, N. Y. To facilitate roasting meats, etc., this invention provides a pan in which the meat may be thoroughly basted as often as required by operating a handle on the exterior of the pan. The pan is preferably cylindrical, divided into two longitudinal sections and held on a base to stand properly in the oven. Supported at a little distance above the bottom of the pan is a platform on which is placed the meat to be cooked, while below this platform extends a scoop adapted to receive the juices or gravy of the meat, the scoop being held so as to be revolved by a crank, by which means the juices of the meat may be taken up and poured over the meat, thus making unnecessary the hot and unpleasant work of basting by hand.

**EGG BEATER.**—Frank S. Bellanger, Waterbury, Conn. The frame of this beater is preferably made of a single piece of wire formed of parallel guideways connected with a handle, and also formed into short outer arms by doubling the wire, while the beater which revolves in the frame is likewise formed of a single piece of wire bent to form fingers to be revolved between the arms, such rotation being effected by moving a nut up and down on a screw rod which extends up between the guideways.

**BED.**—Elbert E. Munger, Spencer, Iowa. According to this invention, a mattress frame is mounted to rock on and swing within the bed frame, a leg hinged to one end of the mattress frame being capable of holding it in tilted position, while a seat is adjustably held by the bed frame and two limb supports are hinged to the seat board, means being provided for supporting the free ends of the limb supports. The mattress may be crumpled and folded to form a comfortable cushion upon the seat board and easy back and limb rests when the mattress support is swung into inclined position.

#### Designs.

**PARASOL.**—Oscar M. Arnold, New York City. A design for parasols to correspond with tailor-made gowns has been patented by this inventor, the ornamentation of the parasol consisting of raised and continuous embroidery ornamentation.

**BICYCLE TOE CLIP.**—David Basch, New York City. This toe clip has a horizontal body portion, a drop member and a toe piece, and the peculiarity of the design is in that portion of the clip which connects with the pedal, there being hook extensions of the body portion projecting rearward of the drop member.

**SHOE HORN CLAMP.**—William E. Gregory, Astoria, Oregon. This is a device for use in connection with a shoe horn, with which it has pivotal connection, and by means of which the horn may be clamped on the back seam as it is used to guide the foot to place in the shoe.

**NOTE.**—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.

#### NEW BOOKS, ETC.

**SHOP AND ROAD TESTING OF DYNAMOS AND MOTORS.** By Eugene C. Parham, Electrician of Johnstown Steel Motor Company, and John C. Shedd, Professor of Physics, Marietta College. New York: The W. J. Johnston Company. Pp. 576. Price \$2.

The authors have here provided a manual which is the outcome of their experience on the testing floor and road, and which is designed to be alike helpful to the student fresh from text book examinations and the self-taught practical man. The book is designed to give a complete theory of the commercial testing floor, so far as it relates to direct current machines, and of the applications of theory to practice, while also meeting the demand of operating companies for a manual that will enable them to do their own repair work and testing.

**THE CALORIFIC POWER OF FUELS.** By Herman Poole, F.C.S. New York: John Wiley & Sons. Pp. 279. Price \$3.

This book treats of a large and complex subject, in which engineers are always interested. The work was originally commenced by the author as a translation of M. Scheurer-Kestner's "Pouvoir Calorifique des Combustibles," changes in which have been made to adapt it to American methods and data, and there has been added a collection of tables of heats of combustion of fuels, solid, liquid and gaseous. The work embraces only that portion of calorimetric determinations having a bearing on fuel values, and a concise description is given of the leading calorimeters, with some examples of working and calculations. In an appendix is the report of the committee on boiler tests of the American Society of Mechanical Engineers, December, 1897.

**ANGEWANDTE ELEKTROCHEMIE. Zweiter Band. Anorganische Elektrochemie. Erste Abtheilung. Elektrochemie der Metalloide und der Alkali-metalle.** Von Dr. Franz Peters Leipzig: A. Hartleben's Verlag, 1898. Pp. 248. Elektro-technische Bibliothek. Band XLVIII.

**ANGEWANDTE ELEKTROCHEMIE. Zweiter Band. Anorganische Elektrochemie. Zweite Abtheilung. Elektrochemie der Erdalkali, Erd und Schwermetalle.** Von Dr. Franz Peters. Leipzig: A. Hartleben's Verlag. Elektro-technische Bibliothek. Band XLIX. 1898. Pp. 215.

**LA PHOTOGRAPHIE ET L'ETUDE DES NUAGES.** James Boyer. Paris: C. Mendel, publisher. 1898. Pp. 80. Price 40 cents.

The various observations recommended by the International Meteorological Congress for the observation of the clouds are given. The work was terminated in 1897. The present book gives details as to the method employed in photographing the clouds, and gives excellent examples of the results obtained.

**THE X RAYS. Their Production and Application.** By Frederick Strange Kelle, M.D. New York. Pp. 191. Price \$1.25.

In the present volume it has been the specific aim of the author to present to the reader, student or surgeon a concise treatise on the use and value of Prof. Roentgen's discovery.

**ALUMINUM. The Pittsburg Reduction Company, Pittsburg, Pa. Second edition.** 1898. Pp. 266, 16mo. Price \$1.50.

Though this book may be looked upon somewhat in the line of a trade publication, still it is of the greatest possible value. We do not know of any book on aluminum which contains so much practical information regarding the working of aluminum. It does not pretend to go into the subject of the manufacture of aluminum, like Richards' large work, but it is filled with valuable points for those who use aluminum in any form. It is eminently fitting that a publication of this kind should be issued by the largest producers of the metal in America, as no one is so well qualified to give reliable information regarding the metal. The arrangement of the book is excellent, and the supplementary tables are valuable. It is edited by Alfred E. Hunt, S.B.

**RESULTS OF RAIN, RIVER AND EVAPORATION OBSERVATIONS. Made in New South Wales during 1896.** With maps and diagrams. By H. C. Russell, Government Astronomer. Sydney: Department of Public Instruction. Meteorology of New South Wales. 1897. Pp. 209.

**A CATALOGUE OF EARTHQUAKES ON THE PACIFIC COAST, 1769 TO 1897.** By Edward S. Holden, LL.D. Smithsonian Miscellaneous Collections, 1087. Washington. 1898. Pp. 254.

**THE LOCOMOTIVE.** Published by the Hartford Steam Boiler Inspection and Insurance Company. New Series, No. XVII. Hartford, Conn. 1897. Pp. 191.

**REPORT OF THE COMMISSIONER FOR THE YEAR ENDING JUNE 30, 1897.** United States Commission of Fish and Fisheries. John J. Brace, Commissioner. Part XXIII. Washington. 1898.

**L'ALGERIE. Le Sol et les Habitants, Flore, Faune, Géologie, Anthropologie, Ressources Agricoles et Economiques.** Par J. A. Battandier and L. Trabut. Paris: Baillière et Fils. 1898. Pp. 360.

The Mechanical Engineer is the title of a new paper published by the Scientific Publishing Company, of Manchester, England. It is edited by the well known engineer, William H. Fowler. A careful examination of the first few numbers has proved very satisfactory. There has been no question that a paper of this kind has been needed in England for some time past. We are glad to see it is being conducted with a special view to accuracy—apart from which our Transatlantic brethren are not conspicuous for, specially regarding those things relating to America. There seems to be a brilliant future for this paper. The subscription price in the Postal Union is 25 shillings. It is excellently illustrated, and among the departments are: "Our Contemporaries," "Book Reviews," "Railroad Notes," "Electrical Notes," "Shipping Notes," "Industrial Notes" and "Correspondence."

Mahatma is a paper devoted to the interests of the magician, etc., has been revised and gives promise of a considerable popularity among those who are interested in magic. It is published by G. H. Little & Company, 493 Sixth Avenue, New York City, N. Y. Subscription price is \$1 per year.

We have received the descriptive catalogue of the Institute for Home Study of Engineering, Cleveland, Ohio. We judge from an examination of this catalogue that the Institute is well equipped for giving courses to those who are unable to attend a college or scientific school. This method of instruction is becoming deservedly popular, and the institution to which we refer seems to be well equipped for giving instructions of this nature. The instructors are all practical men with college educations who had considerable experience in actual work. All those thinking of taking a course in steam, electrical, mechanical, or hydraulic engineering should send for this catalogue.

#### Received.

"The Georgian Period," being measured drawings of colonial work, is the title of a series of handsome portfolios now being published by The American Architect and Building News, of which we have received Part I. They include some fine gelatine prints, and illustrate the details of domestic and public buildings in the New England, Middle and Southern States.

Some Homes built by Wendell & Smith is the title of a book in paper covers containing numerous well executed half tone illustrations from photographs of modern houses built by the publishers at Overbrook, Pelham, Wayne and St. David's, Pennsylvania. Copies may be had by addressing Wendell & Smith, Philadelphia, Pa.

Easy Lessons in Mechanical Drawing and Machine Design. By T. G. A. Meyer. New York: Arnold Publishing House. We have received Part I. of Volume I. of this excellently printed work, which is well adapted for beginners and students desiring to learn practical mechanical drawing. Price 50 cents.

#### 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 the following week's issue.

Marine Iron Works. Chicago. Catalogue free.  
"U. S." Metal Polish. Indianapolis. Samples free.  
Emery, etc., etc. The Tanite Co., Stroudsburg, Pa.  
Gasoline Brazing Forge, Turner Brass Works, Chicago  
Yankee Notions. Waterbury Button Co., Waterbury, Ct.  
Bicycle Electric Light Co., Cleveland, O., want agents.  
Handle & Spoke Mch. Ober Lathe Co., Chagrin Falls, O.  
FERRACUTE Machine Co., Bridgeton, N. J. Full line of Presses, Dies and other Sheet Metal Machinery.  
Improved Bicycle Machinery of every description. The Garvin Machine Co., Spring and Varick Sts., N. Y.  
Gasoline Engines and Launches. Free catalogue. Monitor Vapor Engine and P. Co. Grand Rapids, Mich.  
The celebrated "Hornby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

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

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

## Notes & Queries

#### HINTS TO CORRESPONDENTS.

**Names and Address** must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.  
**References** to former articles or answers should give date of paper and page or number of question.  
**Inquiries** not answered in reasonable time should be repeated: correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.  
**Buyers** wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.  
**Special Written Information** on matters of personal rather than general interest cannot be expected without remuneration.  
**Scientific American Supplements** referred to may be had at the office. Price 10 cents each.  
**Books** referred to promptly supplied on receipt of price.  
**Minerals** sent for examination should be distinctly marked or labeled.

(7414) W. J. W. asks: 1. Is not glass a non-conductor, and are the glass insulators used on the cross arms of poles so that no current can pass into the pole? A. Yes. 2. Will a growing tree conduct electricity or is it a non-conductor? A. Wet wood is a fairly good conductor. Dry wood is not. 3. Should the wires be carried through trees and in some cases actually wired onto the boughs? A. We think this is a bad practice, particularly to have the wires loose, so that they can swing and rub upon the boughs. 4. What would be the result if both wires should be rubbed bare on a tree (that is, the insulation rubbed off)? A. There would be a great deal of current lost by leakage. 5. Is there sufficient strength in 100 volts to seriously injure one, if wires should be broken and came in contact with a person passing by? A. No, if the current is direct, except an arc should form so as to burn him. There would be no shock through the body from 100 volts. If the current is alternating, it would be more than any one could safely receive. 6. Does the gauge of wire make a difference in the strength of current? A. The size of wire is determined by the amperes of current it is to carry without overheating. 7. Does the current have the same effect on a person if standing on ground or on wood floor? A. That depends upon dryness and dampness, as in 2 above.

(7415) S. says: Please inform me how to back a map or other drawing with muslin, so it will lie smooth and not wrinkle; and if common flour paste will answer, and if the paste is put on the paper or cloth, etc. A. Stretch your muslin (ordinary cotton stuff) on a wooden stretcher by means of tacks; cover your map on the back with an even and thin coat of good boiled starch or flour paste or other sticking material, no matter what, if it only sticks. Lay the map on the cloth, only taking care to do this smoothly and to avoid wrinkles; rub it evenly down after temporarily covering the place you rub with a piece of clean paper, so as to avoid friction over the map itself. Let it dry, and the work is done. In order to avoid wrinkles, it is quite essential to let your paper map, after being covered with the starch paste, soak for a few minutes, so as to give the paper a chance to expand from the moisture. It will then, while contracting from the drying, obtain a very smoothly stretched surface.

(7416) F. E. writes: 1. I came in possession of an aneroid barometer and do not fully understand its markings. The outer circle is marked from 0 to 15,000 feet altitude; the inner circle, from 17 to 31 inches atmospheric pressure; but there are, besides the markings, rain, change, fair, on the north of the dial, and I cannot understand to what use they are put in case I am on the top of a mountain of 8,000 feet when the hand points south. A. The use of words rain, fair, clear, dry, etc., on a barometer is a survival of an old practice. These words have no connection whatever with the indications of the weather by the instrument and would be entirely wrong at different altitudes. With a falling barometer, storm is predicted; with a rising barometer, clear weather is indicated. 2. And what is the object of making the outer circle movable all round? A. The outer circle of your barometer, upon which feet are marked, is to be used as follows: Set the circle with its 0 feet coinciding with the index at any time. As one climbs or descends mountains, the barometer will then indicate his change of altitude. If this circle were set at the sea level, it would show one's altitude above sea level. This ring must be movable, to admit of adjustment to the rising and falling of the barometer.

(7417) D. McG. asks how to preserve a white pine flag pole (large size), leaving the sap wood on, the sap is somewhat thick, and to trim it off will reduce the pole too much. Would coal tar be better than white lead? Would like a lasting material and a preserving one as well, and at the same time not expensive. A. Answer by B. F. Fernow, Chief of Forestry Division, United States Department of Agriculture. No paints or coal tar are to be considered a satisfactory preservative to be applied to a flag pole with the sap wood left on. The best preservative for such a purpose is carbolineum, or any other heavy coal tar oil will answer. The pole should be left to season, under roof if possible, and the carbolineum should be supplied when the pole is dry. There are various brands of this preservative to be had, each claiming superiority. The so-called carbolineum avenarius is to be had through the Carbolineum Wood Preserving Company, Nashville, Tenn. Another, cheaper and perhaps for this purpose just as serviceable material is sold by Brume, Grosche & Company, 59 Terrace, Buffalo, N. Y. A half or five-eighths inch rod of iron will answer for the protection of a single pole like this from lightning. Joints should be coupled with firm screw couplings.

(7418) P. B. K. asks: 1. What would be the result if the wire gauze should be left out of an acetylene gas burner, and the orifice in the burner tip should become enlarged so as to allow the flame to enter the service pipes? A. Should there be no mixture of air with the acetylene, the gas would burn at the mouth of the pipe as ordinary gas does, but if any air is mixed with the gas, there would be an explosion. 2. Would it be advisable to force the gas through about one inch of water between the gas generator and the service pipes in the building as a precaution against the flame reaching the generator? A. A water seal is not necessary if proper care is exercised to prevent air from mixing with the acetylene gas. The holder should be thoroughly blown out to remove all the air before attempting to light the gas.

(7419) G. W. P. asks (1) how to make an induction coil for an experimental telephone transmitter. A. The induction coil of the Blake transmitter has a primary winding of about 180 turns of No. 22 A. W. G. single-covered copper wire, and the secondary coil has over 4,000 turns of No. 27 A. W. G. similar wire. The coil is made in the same manner as any other induction coil for a light current. For Blake transmitter see SCIENTIFIC AMERICAN SUPPLEMENT, No. 250, 10 cents by mail. 2. How are strong magnets made, of what kind of steel and temper? A. Permanent magnets should be made from the best tool steel, tempered hard at the ends only, but left soft in the middle. Stubbs' or Jessup's steel is commonly used. They are best charged by inserting them in a coil of wire through which a current of electricity is flowing. 3. A neighbor and myself have made a Hopkins (Bell) telephone which works ¼ of a mile with ground return. How can we make an inexpensive signaling device? A. There are numerous signaling devices. SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 162, 966, 10 cents each, will give you instruction with drawing for making several forms. 4. What can we employ as the simplest and best in the way of a lightning arrester for our experimental telephone? A. Lightning protection for telephones is treated in SCIENTIFIC AMERICAN SUPPLEMENT, No. 652, 10 cents. The ordinary saw tooth lightning arrester of telegraph instruments will probably serve your purpose.

(7420) H. M. M. asks: Is it good practice to varnish or shellac the disks of a Wimshurst influence machine, when vulcanite is used in place of glass? If so, may the shellac cover the tinfoil segments (except where the brushes of the neutralizer touch)? Is the 18 inch disk machine described in one of your SUPPLEMENTS of sufficient capacity for X ray work? A. The varnishing of the glass plates of Wimshurst and other static machines is to prevent the deposition of moisture upon them, since glass is very hygroscopic. It is not necessary to varnish well polished vulcanite, though there is no objection to doing so. The tinfoil can be left without shellac. For X ray work plates 18 inches in diameter may be used, but they must run very fast, 1,800 to 2,500 turns a minute, and there should be at least two revolving plates.

(7421) E. H. P. asks: 1. Is there a substance the thickness of paper or pasteboard through which the magnet would have no attraction for a needle? If so, what is it? A. A plate of sheet iron will produce this effect, and iron is the only known substance which will do so. 2. How long will a six-inch horse shoe magnet hold its attractive power with or without the armature? A. It is a matter of difficulty to so use a magnet as not to weaken its magnetism. Whenever the magnet is not in use, its armature should be on the poles. In this condition its magnetism will be retained for any length of time without change. If it be left without an armature, it is liable to loss of strength. It will also lose strength if the armature is slammed upon the poles, though the strength is not weakened by suddenly pulling the armature off the poles.

#### TO INVENTORS.

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

## INDEX OF INVENTIONS

For which Letters Patent of the

United States were Granted

APRIL 19, 1898,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Acetosulfanilate, making alkaline, Schaerges & Schwarz..... 602,646  
Acetyl derivative of phenetidin, Schaerges & Schwarz..... 602,680  
Acid, producing orthotoluene sulfonic, W. Dietterle..... 602,682