

## RECENTLY PATENTED INVENTIONS.

## Railroad Appliances.

**TRANSMITTING POWER.**—Timothy W. Lemieux, Duluth, Minn. This invention covers a device for transmitting a reversible motion from a continuous running cable, for use with traction railways, which will effectually operate as a means for reversing the moving direction of the car, and also make a simple and positive gripping device in its connection with the cable and the car.

**CAR BRAKE AND STARTER.**—John B. Swain, Newbern, Ind. Adjacent to a disk rigidly mounted on the car axle is a ring inclosing a coiled spring, one end of which is secured to a projection on one side of the disk, while the other end is secured to the ring, the spring being wound up by the stopping of the car and giving out its energy as the car is started, or to assist the car over up grades, the invention covering numerous novel features facilitating the working of this principle.

**CAR COUPLING.**—Samuel T. Grimmer, West Plains, Mo. This is an improvement in couplings employing a link and pin, and provides means whereby the coupling may be effected without the operator going between the cars, spring arms being secured within the drawhead, and one of the arms having a socket arranged to receive the end of a link.

**CAR DOOR.**—Edward B. Searles, Baltimore, Md. The door is made with peculiarly constructed shoes or bearings, with novel connections with the door, and novel door securing or fastening contrivances, to prevent the entrance of flying sparks or of moisture around the door.

**CAR HEATER.**—John Q. Winfield and Benjamin H. Strickler, Broadway, Va. This invention consists of certain novel parts and details, and combinations thereof, for an improved car heater, designed to furnish pure heated air to the cars, while not liable to set the cars on fire in case of accident.

**RAILROAD TIE.**—Michael Maloney, Ironton, Ohio. It is a metallic tie made cross shape in cross section and having openings in its top flange and offsets on its horizontal flanges, a bolt secured to the top flange having a head projecting on the base of the rail, being very simple and durable, and permitting an easy placing or removal of the rail, which it is designed to hold securely in place.

## Engineering.

**SHAFT BEARING.**—Benjamin A. Dobson, Bolton, Lancaster County, England. A non-rotating metal bushing forms a journal for the shaft, and is fitted with an eccentric sleeve, which is fitted within a second eccentric sleeve supported by the pedestal, with means for operating the eccentrics to adjust the position of the shaft with the bushing as required, being particularly intended for use with carding engines.

**AIR DRAUGHT ENGINE.**—Otto A. Benkenorf, Wilmet, Kansas. This invention covers a novel arrangement of wheels and air guides upon a vertical rotary shaft in an upright air flue, the upward draught of which may be stimulated by heat from below or by a ventilating cowl on the top of the flue.

## Miscellaneous.

**BLOW PIPE.**—Edward B. Powers, Taunton, Mass. The ordinary blow pipe is provided with air and gas cut-off valves, which are operated by pressing upon a spring-supported rod, the head of the latter being in such relation to the stand of the blow pipe that it may be easily reached by the hand of the operator when taking up the blow pipe or laying it down, the invention also covering improvement in the air valve and its connection with the gas valve and operating rod.

**BEVEL GAUGE.**—Milon O. Godding, Monrovia, Cal. It is a hinged plate or guide, with supporting plate adapted for attachment to the utensil with which it is to be used, the guide having curved or segmental guide rods and a graduated segment, with which registers a pointer or index also applied to the supporting plate, with other novel features, for producing any required bevel or a cut of any angle.

**MOULDING MACHINE.**—Martin W. Walker and William Jowitz, Sing Sing, N. Y. A carriage carrying an endless belt supports the moulds and passes them through a sand machine in which sand is filled into the mould, after which the moulds are distributed on the floor of the foundry.

**MAKING MALT.**—Justin Whitney, Boston, Mass. The apparatus employed consists of a vertical hollow shaft to which rotating horizontal pans are attached, in which the grain is at first exposed to a forced current of moist air at low temperature, subsequently to a forced current of moderately heated air, and later on more highly heated air, until the malt is finished.

**STEREOTYPE PLATE.**—Lucius Goss, Upper Montclair, N. J. This is a plate cast with several spaced or separated columns joined at the ends, whereby the longitudinal sawing of the columns is avoided, and whereby the edges of all the columns in the plate may be trimmed at one operation.

**FIGURED FABRIC.**—Thomas Taylor and Jacob Warburton, Bolton, Lancaster County, England. The fabric is made with two shuttles, one carrying a coarse weft for the back and filling of the figure, and the other a fine weft for the face of the ground and figure, two warps being employed, one woven tight and the other slack, to produce figured fabrics with a raised fine figure upon a level ground, for bed quilts, toilets, etc.

**BOAT.**—Albert L. Shears, St. Louis, Mich. The planking is first bent over a form and its ends secured at the stem and stern, transverse bands being passed around the structure from the gunwale and adjusted to draw the longitudinal edges of the planking together, the boat being made without the usual ribs, the keel being detachable, and the seats removable, supported on angular brackets.

**FURNITURE DRAWER.**—George Bower, Fayette, Mo. A roller is journaled on the rear of the drawer, with projecting ends, around which cords are wound having their ends secured to the front and rear of the casing, making a guide device whereby the drawer may be moved in and out of the casing in an easy and effective manner without sticking.

**INHALING TIP.**—Myron S. Green, New York City. This tip, adapted to fit a vertically bored cork inserted in the mouth of a bottle, is so made that when the stem is but partially screwed into the socket, the operator, having the nipple end of the stem inserted in the nostril, may inhale or exhale without removing it, while by screwing down the stem the bottle is effectually sealed.

**WATERPROOF COMPOUND.**—Carl Grunzweig, Ludwigshafen-on-the-Rhine, Germany. It is a granular, non-heat-conducting compound, consisting of ground cork, the granules of which are provided with a thin external coating of resin and asphalt.

**VELOCIPEDE.**—Calvin Jackson, Jacksonwald, Pa. The vehicle allows leveling of the axles and plumbing of the main driving wheel tires on transversely sloping roads, also an arrangement of a main central seat frame allowing it to be shifted laterally to level the seats, the machine being more especially adapted for four riders, and embodying various minor improvements.

**WAGON BRAKE.**—James R. Robinson, Cornelia, Mo. A sliding brake frame is employed, having brake shoes pivotally connected by a rod with a lever pivoted to the side of the wagon adjacent to the driver's seat, the brake being easily adjusted and effective, while simple in construction.

**FIRE ESCAPE.**—Rudolph A. Reiss, Hoboken, N. J., and Edward Pettenkofer, New York City. It consists of a casing with automatically opening doors attached to a building, a frame detachably secured in the casing, with a trough-shaped chute, and ropes extending beyond the chute for detaching the frame from the casing and drawing it down.

## SCIENTIFIC AMERICAN BUILDING EDITION.

## JANUARY NUMBER.—(No. 39.)

## TABLE OF CONTENTS.

1. Elegant plate, in colors, showing perspective view of a one story Southern house, costing two thousand two hundred dollars. Floor plans, etc.
2. Plate, in colors, showing a block of economic brick dwellings. Floor plans, elevations, with details, etc.
3. The Washington Building, New York City. Full page engraving.
4. Design for the new post office and revenue office, Sacramento, Cal.
5. The new government building at Binghamton, N. Y.
6. Plans and elevations for a two thousand five hundred dollar cottage.
7. The Tacoma Building, Chicago. Half page engraving.
8. A seaside summer house. Cost, about five thousand dollars. Plans and perspective.
9. Church of St. Paul, Luton. Half page engraving.
10. A dwelling near Newark, N. J., recently erected at a cost of about five thousand five hundred dollars. Plans and perspective.
11. View of the main entrance to Melrose Park, near New York.
12. A house for five thousand five hundred dollars, lately erected at Flatbush, Long Island. Plans and perspective.
13. A residence recently erected at East Orange, N. J., at a cost of five thousand four hundred dollars. Perspective and floor plans.
14. A Queen Anne cottage at Flatbush, Long Island. Cost, eight thousand dollars. Plans and perspective.
15. A cottage lately built at Flatbush, near Brooklyn, N. Y. Cost, six thousand dollars. Floor plans and perspective.
16. Design for an English cottage.
17. Construction of mills. Section of mill showing construction of two floors and roof.
18. Engravings and plans of some economical houses, ranging in cost from three hundred to one thousand dollars.
19. Miscellaneous Contents: Construction and finish of house flues.—Iron roofs.—Restricting heights.—Traction over different pavements.—Dry rot in timber.—The ancient catarract of the Hudson.—Wall plastering.—Mineral wool as a filling.—A new form of drain pipe, with sketch.—Natural gas lighting.—Lane patent door hanger.—Automatic temperature regulators, illustrated.—The Prindle metallic wire packed unions, illustrated.—Architectural wood turning, illustrated.—Filling the hollow spaces in walls and floors of buildings.—Terra cotta lumber.

The Scientific American Architects and Builders Edition is issued monthly. \$2.50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practically, a large and splendid MAGAZINE OF ARCHITECTURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

The Fullness, Richness, Cheapness, and Convenience of this work have won for it the LARGEST CIRCULATION of any Architectural publication in the world. Sold by all newsdealers.

MUNN & CO., PUBLISHERS,

361 Broadway, New York.

## 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.

Pattern letters and figures to place on patterns for castings. (H. W.) Knight & Son, Seneca Falls, N. Y.

Leather clothing wears forever. Coats, \$6.00. Pants, \$5.00. Vests, \$3.00. Delivered anywhere. Perfect Clothing Co., New York, P. O. box 2638.

Patent for new educational appliance, No. 390,397, for sale or license. Apply J. M. Pringle, Alice St., New York, Sydney, New South Wales.

New carpet stretcher patent for sale or on royalty. E. C. Ellwood, Green's Farms, Conn.

Air compressor for sale cheap. Also steel tanks, iron rail cars, etc. Address The Buffalo Wood Vulcanizing Co., Buffalo, N. Y.

Pratt & Letchworth, Buffalo, N. Y., solicit correspondence relative to manufacturing specialties requiring malleable gray iron, brass, or steel castings.

For the latest improved diamond prospecting drills, address the M. C. Bullock Mfg. Co., Chicago, Ill.

Link Belting and Wheels. Link Belt M. Co., Chicago.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Perforated metals of all kinds for all purposes. The Robert Aitchison Perforated Metal Co., Chicago, Ill.

The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describing water works machinery, and containing reports of tests, on application.

No. 11 planer and matcher. All kinds of woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. The D. Frisbie Co., 112 Liberty St., N. Y.

"How to Keep Boilers Clean." Send your address for free 96 page book. Jas. C. Hotchkiss, 120 Liberty St., N. Y.

The best Coffee roasters, coolers, stoners, separators, polishers, scourers, glossing apparatus, milling and peaberry machines; also rice and macaroni machinery, are built by The Hungerford Co., 69 Cortlandt St., N. Y.

Magic Lanterns and Stereopticons of all kinds and prices. Views illustrating every subject for public exhibitions, Sunday schools, colleges, and home entertainment. 152 page illustrated catalogue free. McAllister, Manufacturing Optician, 49 Nassau St., New York.

Lathes for cutting irregular forms. Handle and spoke lathes. I. E. Merritt Co., Lockport, N. Y.

Ax handle and spoke lathes. Railway cutting off saw machines. Rollstone Machine Co., Fitchburg, Mass.

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

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

## NEW BOOKS AND PUBLICATIONS.

**THE CONVERSATION METHOD, FRENCH.** By Edmond Gastineau, A. M. Ivison, Blakeman & Co., Publishers.

This work, just published, starts out by giving the pupil idiomatic phrases of an every-day nature and necessity, just as a child hears and takes up one by one the set phrases spoken around him. These idioms and phrases are rehearsed again and again in conversations, although constantly varied and enlarged upon by the introduction of new words. In this way, the pupil's stock of necessary words and phrases constantly increases, and he soon finds himself master of a sufficient portion of the language to express all his ordinary wants. The process is vivified and made interesting in this book by the assumption that the learner has just landed in Paris, where he finds himself surrounded by the circumstances peculiar to the place and country, and thus is made to learn and to use in conversation just such things as he would need to say if he actually were in France. He goes through railroad depots and custom houses, to hotels, where he orders his rooms, meals, etc. to stores, where he calls for goods and discusses their color and quality; to theaters, concerts, museums, to the opera, the Salon, etc., conversing here about the play and players, there about composers, music, and singers, elsewhere about pictures and painters, etc. French literature even is treated in short but interesting fashion. So, the learner is constantly moving in a French atmosphere, while his training ranges all the way from practical and every-day things to broader and more intellectual subjects. Meanwhile, the grammatical phase of language is by no means neglected. But it is studied subordinately to the conversational element, and in such way that by the time the pupil has reached the end of the book, he finds that almost unconsciously he has acquired a systematic knowledge of the language as well as the power of speaking it. A system of figured pronunciation also accompanies the text. This is based on values as found in Webster, and has evidently been worked out with great care and accuracy. It forms a valuable addition to the work, and makes it also admirably adapted to the purposes of self-study. For the idiomatic excellence of its vocabulary, a happy combination of the interesting with the practical, and the thorough treatment of the language, the conversation method as here presented is admirable, and the more it is examined and studied, the more highly it will be appreciated.

**FORTSCHRITTE DER ELEKTROTECHNIK.** Quarterly report of the latest inventions in electricity, including telegraphs and signals. Edited by Dr. Karl Strecker. Second volume. First number for 1888. Berlin: Julius Springer, 1888. Pp. 197.

In this report are compiled the names of inventors and writers on applied electricity, with a short description of the devices and conclusions reached by the various writers and inventors. The patents, periodicals, etc., in which the several inventions and reports can be found are given in full, with date, etc. The first chapter

treats of electro-mechanics, with its various subdivisions; the second of electro-chemistry, with the three subdivisions of primary and secondary batteries and applied electrolysis; the third part relates to telegraphs, telephones, and signals; the fourth to measurements; and the fifth and last to earth currents, atmospherical electricity, lightning rods, etc. The work will undoubtedly prove a very valuable reference book.

"Chemistry as She is Wrote."—A very curious book is the one that has just appeared from the press of Remington & Co. It is entitled "A Correlation Theory of Chemical Action and Affinity," by Thomas Hall Wright, M.D., of Balvia. It bears the same relation to chemistry that the famous book "English as She is Spoke" does to philology. As a sample we present the following paragraph: "The pressure Forces of Gravities, and the shine Forces of the Stars, and of the Sun, and of the Planets—in other words, the graduated pressure Force and the Graduated photothermal Force, namely plus and minus Heat and Light—heaviness and lightness, Light and Heat, Cold and Shade, the sidereal Fires or Shines, and the planetary Fires or Shines—exist throughout the Earth globe, and the Universe, and for All things, and therefore, also and indeed for Chemistry, and most especially for Cosmical Chemistry." There are between three and four hundred pages of such statements.

The Smith & Anthony Stove Co., of Boston, Mass., manufacturers of "Hub" ranges, have issued a beautiful calendar for 1889. It is in six sheets, tied together by a ribbon, each sheet being a fac-simile of a delicate water color drawing of charming sketches of child life, together with attractive landscape scenes.

The Union Metallic Cartridge Co., whose factory is at Bridgeport, Conn., in the 1889 calendar they are sending to their customers give representations of some hunting and frontier scenes, the most prominent figure being that of a young lady armed with a gun and deftly using the company's cartridges in the field of action in loading it.

The Gurney Hot Water Heater Co., of Boston, are likewise sending out a very neat calendar, on which is an admirable representation of their most improved form of heater, used for heating private dwellings or public buildings by hot water circulation.

The American Frost Meter Co., of Boston, has recently issued, in convenient form for reference, a book of meter tables giving number of United States gallons for each cubic foot, from one to 1,000,000, the tables being compiled by George A. Ellis, C.E.

Any of the above books may be purchased through this office. Send for new book catalogue just published.

Address MUNN & Co., 361 Broadway, New York.

## Notes &amp; 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.

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.

(158) I. E. P. asks for a formula for a good disinfectant. A. Sulphate or chloride of zinc dissolved in water is excellent; thymol is considered a good aerial disinfectant.

(159) San Diego and F. W. D. ask: 1. What are the ingredients that enter into the composition of hand grenades for putting out fire? A. Water mixed with different salts. Sulphate of soda and bicarbonate of ammonia are very good ingredients. 2. Are there any chemicals that will render kerosene oil non-inflammable, and what are they? A. No. 3. What is asbestos composed of? A. It is a natural mineral of the family of anhydrous silicates, formed by decomposition of the hornblende or pyroxene type of rock. 4. What preparation is used to make stage clothing and scenery non-inflammable? A. Tungstate of soda is very efficient. Sometimes scenery is painted on wire gauze.

(160) C. E. D. writes: I have a meerschau pipe which has been "burnt" in coloring, the top of the bowl being the natural color, while the lower part and stem are a rich brown. Is there any efficient receipt for bringing the whole pipe back to its natural color, so that it can be recolored again? A. Meerschau pipes are sometimes heated in melted beeswax for ten minutes. It is better to send it to a reliable dealer for treatment.

(161) F. B. C. asks: Could I charge a storage battery of one cell by means of the electricity generated by a 16 in. belt, moving vertically (length about 100 ft.), from which I now, by means of wiring, light 105 gas jets, ordinary tips, one at a time? Spark from 1/4 in. to 1 in. according to condition of weather. Or if not, how could I intensify it (the current)? A. You ask for an impossibility in a practical sense. The current has such high potential and so little quantity that it would not work for the purpose named.

(162) W. H. D. asks (1) for a good recipe, whereby he could clean thoroughly oil paintings, and restore them to their original colors. A. No such receipt can be given. If the paintings are valuable, they should be put in the hands of a professional restorer, who will adapt his methods to the requirements of the case. 2. To what purpose could large quantities of

oyster shells be put? A. They could be used in making shell lime for gas works, or for road making. A shell road is equal to a macadamized road in quality. New Orleans is celebrated for its shell roads.

(163) F. C. H. asks: What is the reason that when I use a microphone in the circuit with a Bell telephone receiver, and when the microphone is spoken to, that each sound of the voice is accompanied with a scraping sound audible in the receiver? And will you please tell me how to remedy it? A. The microphone is badly adjusted, and probably breaks the circuit. The carbon electrodes should be held more tightly pressed together, or their surfaces may be deficient in finish.

(164) C. E. B. writes: I am desirous of making a model composed of rubber, the same as the large rubber bands. Will you be kind enough to tell me how I can mould it? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 555, which we can send you for ten cents, for process of moulding India rubber type. This will probably cover your needs.

(165) W. A. H. asks: Will condensed steam create a vacuum in a siphon or injector the same as steam does? And do you think an air siphon could be built, supposing the air to be under 30 to 35 pounds pressure? A. It will in the jet siphon; the injector depends upon the condensation of steam, and will work with air as in steam blowers. An air siphon could readily be built to work as described. For general descriptions of pneumatic machinery, we refer you to our SUPPLEMENT catalogue and indices of SCIENTIFIC AMERICAN.

(166) J. B. asks for the constituent parts of the transfer ink as used in the various autotypist systems. A. Aniline colors mixed with water and glycerine or with vaseline are the general constituents of such inks.

(167) J. S. writes: Please give me a receipt for mucilage. A. Dissolve gum arabic in water, until thick enough to suit the requirements.

(168) C. S., J. H. C., and others.—For printer's rollers use 10 1/2 lb. best glue; 2 1/2 gallons black molasses, or honey; 1 lb. India rubber, dissolved in alcohol; 2 oz. Venice turpentine; 12 oz. glycerine; 4 oz. vinegar. This formula is given for the mysterious "black composition, so durable and elastic, and known to but very few persons until recently. Purified rubber only to be used. The old home recipe is 2 lb. glue, soaked overnight, to one gallon of New Orleans molasses. In cold weather more molasses is used, but the press room should be kept at about 70°. The mould should be of iron, perfectly smooth and oiled inside; never heard of a wood mould being used.

Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The number of the enquiry should head the reply.

(169) Will you please let me know if there is any way to keep blue checked cotton, such as is used for overalls, from fading and shrinking? I have a roll which turns brown and shrinks about three inches when made up.—F. W. M.

(170) 1. How can I cut and polish stones and minerals? 2. What tools and materials are used? 3. What size wire on the field magnets and armature should I use in making a dynamo twice the size of the one described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600?—O. I. F.

(171) Could you give me a receipt for making a walnut stain (water) and an ebony acid stain? Is there a walnut alcohol stain?—T. H. F.

(172) Rule for calculating a safety valve, not a complicated rule, but a very simple rule that a man with a limited education can understand, and an example explaining. Also a receipt for removing zinc and white lead paint from iron.—A. D. C.

(173) I would like to get some pointers in regard to making gaskets for hydraulic pumps. We use a hydraulic pump which has to lift a four hundred ton pressure on a 13 inch ram. Gaskets are continually giving out on connections and plungers, and valves sometimes fail to act. Please give me a rule for speeding up machinery and squaring up diameters or find out the square inches in a given space.—J. A. B.

(174) 1. How can you find out the horse power of a boiler? 2. Are feed pipes liable to burst quicker in front of a boiler than behind?—D. C.

(175) Please inform me the construction principle and operation of the air brake used on cars.—C. S. B.

(176) 1. What number of horse power will be required to generate a sufficient amount of electricity to run fifty arc lights? 2. What will the probable cost be for a plant of sufficient power to run fifty arc lights?—H. C.

(177) Please give me a receipt for cleaning the white keys of a piano that have turned yellow, and what will keep them white? Also a receipt to make black varnish, that which the tinsmiths use on stove pipe, which gives it a nice gloss.—G. H. A.

(178) Please inform me how to color clothing from a light into a dark blue, and also what kind of an eyeglass would you recommend to guard against snowblindness?—H. M.

(179) How can I make a porous brick that will absorb kerosene oil? I want to make a fire-kinder that will kindle wood or coal. Also a brick that could be used as a fuel? There is a fire clay here. Could I make it of that? Please give me a receipt for a good top dressing for carriage tops, and oblige.—C. L. S.

(180) I have some abalone and other sea shells just as they came from the water. I write to enquire the best method of removing the rough outside coating without injuring the shells.—W. B. D.

(181) Can you inform me of a good receipt for making black bicycle enamel, and oblige.—O. K.

(182) Can you tell me how to make phosphorized oil?—A Student.

(183) Could you please give a receipt for taking the green boil off gold that is there after it has been annealed and boiled out in nitric acid pickle? If you could, you would greatly oblige your subscriber.—W. J. S.

(184) I have a small telescope with a two inch object glass, mounted equatorially, with clock works to follow a celestial object in its daily motion, and camera attachment. I have been making efforts to take a photograph of the moon and find that I can get a very good impression one and one-half inches in diameter on the sensitive plate by exposing it two minutes. The image, however, lacks definition, and I am led to believe that the trouble lies in the eye piece of the telescope, which is a simple convex lens of one inch focus. (The focus of the object glass is 36 inches.) If you will kindly give me some suggestions through the columns of your valuable paper, with regard to the style and power of the eye piece, etc., to be used for obtaining a good picture, they will be thankfully received by C. V. A.—Could the size of the picture be increased to good advantage?—V.

(185) We have a hot air furnace and we are notable to get the heat into any room in the direction the wind blows, when in north room facing north cannot get the heat to come in the room, and so with every room facing the wind from different quarters, in a good brick house and the cold air draught taken from the hall way or from outside. Can or is there any remedy, or what are the causes?—C. H. S.

(186) I am thinking of studying, after working hours, some works on electricity. I want a knowledge of the electric light and motors. Could I get a practical knowledge of either or both without teacher? If you think I can, please give price and title of book or books. I know nothing at all about the subject at present.—E. F. C.

(187) How do ocean steamers like the Etruria get their boiler feed water and water for culinary purposes? In other words, do they use sea water in their boilers? I thought they filled up their boilers with fresh water before sailing and used sea water to keep up supply while at sea, using for culinary purposes fresh water carried in tanks from either side. A friend says I am wrong, as they use distilled water for boilers and cooking, from their condensers, but I would not think that that source of supply would be sufficient for both, should think that they would want a separate condenser from that in connection with exhaust.—W. S. B.

(188) What will cement hard and soft rubber together so as to be proof against the action of all acids save those that act upon the rubber?—J. D. B.

(189) Do you know any means to put in order a watch that has been magnetized by a dynamo electric machine, or any solution to prevent it from being magnetized?—H. M.

(190) How many 50 volt lamps would the eight light dynamo of SCIENTIFIC AMERICAN SUPPLEMENT, No. 600, run, if the dynamo were run by a one horse power, 11 inch, rotary water motor? How many with a water motor 6 inches in diameter? How many 25 volt lamps? The dynamo, in all cases being shunt wound.—L. D. M.

(191) What is the best mode to restore oil paintings that are cracked, and the best mixture to add to gold bronze for picture frames? Also are there any well defined principles for a belief.—F. A. L. S.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(1) Hardening Soles of Shoes.—G. W. (1) in Notes and Queries in a recent number of SCIENTIFIC AMERICAN, asks for a receipt for hardening soles of shoes, and you reply that there is nothing practical for such purpose except nails. Stockholm tar rubbed on the soles of shoes hardens the leather materially, renders it impervious to water, and makes it wear much longer than leather not thus treated.—W. M. S.

(16) Grafting Wax.—A good grafting wax can be made by melting together 50 lb. resin, 10 lb. beeswax, and 1 gallon raw linseed oil. As soon as the resin and wax are melted, dip a pint at a time into a bucket of cold water, keeping it away from the bucket with a stick. As soon as it is cool enough, stretch with slightly greased hands. If the wax is to be used in very warm weather, a little less oil and beeswax will be better.—A. T. C.

(21) Utilizing Leather Scraps.—In a former issue of your SCIENTIFIC AMERICAN, one of your readers asks for a receipt to utilize leather scraps. The most establishments first clean and then soak them in a 1 per cent solution of sulphuric acid until soft, and press them into blocks and dry by steam. Now add 1 lb. glycerine to 100 lb. and press into sheets, to be used in soles of boots and shoes.

(27) Bell Telephones, Battery, etc.—1. No change is necessary in the telephones. 2. About 1/2 oz No. 36 silk-insulated copper wire. 3. A single contact transmitter is best, and the use of an induction coil is a great improvement. Put transmitter battery and coil in a local circuit and connect the line wire, receiver terminals, secondary wire of coil and ground together. A transmitter with horizontal diaphragm, having a carbon button in the center, and a small carbon pencil, about 1/2 in. x 1 in., resting vertically upon the button, is about as easily made and as sensitive as any of the ordinary transmitters. It requires no adjustment whatever. 4. See back numbers of SCIENTIFIC AMERICAN SUPPLEMENT. 5. If carbons are dry and the lead runs at a low heat, there will be no injury. Type metal would be preferable. 6. A sealed potash cell works very well on bell and gas lighting circuits. A spark coil is necessary for the latter.—W. A. R.

(27) Lead Connections for Carbons.—Will you permit me space in your paper to say in answer to late inquiry that lead may be successfully used for head caps to carbon heaters, and from a long experience I know it will bind tight enough to make good contact. I have cast lead caps on pretty nearly all forms of carbons, rods, plates, cylinders of rods, plates of rods, etc., using a wooden mould into which to pour the lead. If heated hot enough to run freely, so as to not be chilled by the cold carbons, it will shrink so as to be easily lifted from the mould, and so as to bind so tight on to the carbons as to defy all attempts to loosen it or pull it off. Those who wish to construct batteries from electric light pencils may be glad to know that many of these pencils are defective in manufacture and are rejected on inspection. These defective pencils are not plated, but thrown aside to be ground up and recast or remoulded. They will serve as well as the best for battery use. I bought five hundred full length pencils (12 inches x 1/2 inch) at one time, for two cents a piece, and have used them to construct all kinds of batteries. By getting these naked carbons, the trouble and expense of eating off the copper from those that are plated is avoided, and just as good results obtained. Of course if one can get the refuse pencils from an electric light station for little or nothing, it would pay to use them with the attendant trouble of eating off the copper. But many may not be able to do this, and such can get these condemned pencils at much less cost than new pencils. I prefer the lead cap on the bare carbon as much less liable to damage them, copper plating and then casting on type metal, from any possible leaking of acid through the paraffine in the tips.—C. D. PARKHURST.

(34) Capacity of Wire.—1. The number of volts a wire is required to carry does not affect the size of the conductor. That is determined by the number of amperes. The rule is, allow 800 circular mills per ampere of current carried. The circular mill is the square of the diameter of the conductor in thousandths of an inch; 800 circular mills per ampere for 120 amperes=96,000 circular mills. Diameter of No. 0 (B. and S. gauge) is 0.32495. As thousandths of an inch 324.95 x 324.95 =105,502 circular mills. Therefore No. 0 wire should be used. 2. The dynamo you examined was probably a Gramme machine, in which the current divides, half going through one side of the armature, and half through the other, so that the wire need not be as large as the line. 3. In general, to increase E. M. F., wind armature with more and finer wire; to increase amperes, wind with heavier wire. The amount of saturation of armature core has a great deal to do with it. 4. Yes. [A wire cannot be said "carry volts." Between contiguous molecules there is no difference of potential, although a wire may be carrying a current due to many thousand volts difference of potential as referred to its terminals.—Ed.]

(35) Bleaching and Polishing Ivory.—Slake some lime and put your ivory in the clear water decanted from the residue and boil until it looks white; to polish put in lathe, use pumice stone, and wind up with chamois and a very little olive oil. Make the leather warm. [It is risky to boil large articles of ivory, as it tends to split them.—Ed.]

(41) Burning Tree Stumps.—Bore a 1 in. hole 18 in. deep in center of stump, put in 1 oz. saltpeter, then fill hole nearly full of water, then plug up tight; this is done in the fall and spring. Take out the plug, pour in 1/2 gill of kerosene and set on fire, and it will burn out to the very extreme ends.—C. T.

(41) Burning Stumps; Coloring Maple Sirups.—1. Bore a 2 in. hole slanting in the stump, fill 3/4 full with saltpeter, fill up with water, and cork. After two or three months, pour a little coal oil on the stump and set on fire. 2. Add a sufficient quantity of diluted caramel (burnt sugar).—W. A. R.

(43) Rifle Sights.—If a rifle having globe and peep sights is screwed firmly into a vise and fired at targets, the ball will be found to strike below the line of sight for a distance varying from 50 to 100 feet, if the rifle is sighted for an exact center at say 60 yards. In an ordinary open-sighted rifle, an expert shot will instinctively draw a fine or coarse "bead" as may be necessary to make the ball "drive the center."—W. A. R.

(52) W. D. R.—You can only clean iron wire by pickling in a bath of hydrochloric acid 1 part, water 3 parts. Then run it through a draw plate in oil—or if not convenient, pass the wire through a series of leather wheels charged with four emery and oil; the wheels so arranged and grooved as to touch all sides of the wire.—For Galvanizing.—After pickling as above, pass the wire through a trough of muriate of zinc and ammonia, and immediately through a bath of melted tin or zinc, which, if properly done, will bring out the wire clean and smooth. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 34, for illustrated description of method of galvanizing iron wire.

(53) O. K.—You will find in "Technical Receipt Book," which you can buy for \$2, an article on enameling bricks, p. 415, and on the manufacture of colored enamels, p. 117. Also enamels and glazes for pottery, pp. 221 to 224, Spontaneous Receipts, 3d series, \$2. Also Davis on the manufacture of bricks, tiles, and terra cotta, \$5. Also SCIENTIFIC AMERICAN SUPPLEMENT, No. 337, enameling pottery, with receipts for various colors. Also SCIENTIFIC AMERICAN SUPPLEMENT, No. 402, encaustic tiles, how made.

(54) R. T. F.—1. You can buy thin sheet steel through the hardware trade that is suitable for springs. Cut with a tinsmith's shears, file and drill. 2. To stamp your name on velvet in gold leaf. Sprinkle the space that the name is to cover with pulverized gamboge through a thin muslin bag or piece of silk tied over a small box. Lay a piece of gold leaf of the proper size on the spot. Use printer's type properly set in a frame. Heat the type to about the temperature of boiling water, and press upon the gold leaf for a moment. When cold, brush off the gold leaf and excess of powdered gamboge with a fine brush. Try this on a separate piece of velvet, as you may need a little experience.

(53) Glazing Brick.—The brick is dipped in a transparent colored glaze usually formed, besides the coloring oxides, of: Oxide of lead 40 to 50 per cent, silicious sand 30 to 40 per cent, salt 0 to 12 per cent; flux in an oven. Coloring: Red—Iron, iron sulphate, copper (oxide), ochre. Yellow—Antimony, with sulphate or potash, titanium, chromate of lead, chromate of barytes. Green—Copper, chrome with cobalt. White—White clay, powdered soapstone, 5 per cent tin oxide. The coloring oxides are introduced in quantities usually of 5 to 10 per cent. They act as fluxes, and the composition of the body must be altered in some cases to counteract this.—D. A. S.

(55) Nozzle Streams.—Rubber hose, 100 feet, 60 pounds at hydrant; 1 inch smooth nozzle, 125 feet horizontal, 93 feet high; 1 inch ring nozzle, 125 feet horizontal, 95 feet high; 1 1/4 inch smooth nozzle, 117 feet horizontal, 81 feet high; 1 1/4 inch ring nozzle, 122 feet horizontal, 89 feet high.—J. B. [We can furnish by mail a work on fire streams for \$1.50.]

(55) W. H. G.—With full length of 50 or 100 feet of hose, the 1 in. nozzle will throw the highest. Friction of the water in the hose interferes with the final pressure at the nozzle. The velocity of the water in the hose having the 1 1/4 in. nozzle will be more than 50 per cent greater than in the hose having the 1 in. nozzle. This lessens the pressure and makes the difference in favor of the 1 in. nozzle.

Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

TO INVENTORS.

An experience of forty 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

January 1, 1889,

AND EACH BEARING THAT DATE.

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

Table listing various inventions and their patent numbers, including items like 'Acids, apparatus for concentrating', 'Air draught engine', 'Alarm', 'Album clasp', 'Anchor', 'Animal trap', 'Automatic brake', 'Bag', 'Bak filling machine', 'Bar', 'Bar and beer cooler', 'Battery charging', 'Beams, machine for cutting', 'Belt holder and shifter', 'Bevel gauge', 'Billiard cue handles', 'Bin', 'Binder, temporary', 'Block', 'Blowpipe', 'Blow tester', 'Board', 'Boat', 'Boiler', 'Boiler cleaner', 'Boiler for cleaning or boiling rags', 'Bolt', 'Bolt, C. Borchard', 'Book binding', 'Book mark and clip', 'Boot', 'Boot or shoe lasting machine', 'Boots or shoes, metallic shank for', 'Boring tool', 'Bottle, sponge top', 'Bottle stopper', 'Bottle tilting device', 'Box', 'Box handle', 'Boxes, machine for applying corner stays to', 'Brake', 'Bread board', 'Brick, making', 'Burglar alarm', 'Bustle', 'Button strips', 'Cable tramway', 'Cable tramway gripper', 'Calendar', 'Candle holder for Christmas trees', 'Car brake', 'Car brake and starter', 'Car brake, street', 'Car coupling', 'Car coupling, Heath & Thayer', 'Car coupling, F. W. Parsons', 'Car coupling, H. Sommerfeld', 'Car coupling, D. Wellington', 'Car door', 'Car heater', 'Car, railway', 'Car starter', 'Car step, extensible'