

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

CAR COUPLING.—Robert L. Breth, New Washington, Pa. This invention provides a coupling gate and a detachable frame adapted to be placed over a drawhead, in which a rubber buffer is fitted, there being a coupling hook and a lifting lever for the gate, the device being applicable to ordinarily constructed drawheads, and obviating the necessity of train hands going between the cars.

CAR COUPLING.—Alexander H. Grant, Hobart, N. Y. This is a construction by means of which the coupling pin may be held up in position for coupling, may be automatically coupled by the action of the link, will be prevented from jumping out of its seat, and will not become bent, and with which also high and low cars may be coupled.

Electrical.

TELEGRAPH SOUNDER.—Frank L. Van Epps, Hudson, Mich. Combined with the armature lever and the standard, having registering curved recesses on their lower and upper surfaces, is a roller bearing piece in the recesses, whereby the bearing of the armature lever will be non-adjustable, and the wear of the armature lever will be automatically taken up.

Mechanical.

WORK REST FOR BENCHES.—Alexander Watson, Brookline, Mass. This is an adjustable rest especially designed for use with wood-working machines, being a simple device for effectively supporting the back end of work at the face of the bench, while not protruding to tear or injure the workman's clothes, and one which can be readily adjusted and locked at any required position to support work of different dimensions.

FEEDER FOR BAND SAWS.—Abram B. Springstead, Kalamazoo, Mich. This invention relates to means for ganging and feeding the work, affording a convenient device for attachment to the work table, whereby annular or wheel segments of any desired radius may be readily cut from the stuff worked, and the ends of the stuff rounded to any desired curve.

GIN SAW CLEANER.—George P. Melchior, Bellevue, Miss. This cleaner consists of a shaft having a series of disks, and formed with peripheries of reduced thickness provided with laterally projecting rings of brushes, being an attachment permitting the gin to operate upon wet or damp cotton without clogging the saws and ribs and without injuring or napping the lint.

SPRING MOTOR.—Annie W. Pearce, Greenwood, S. C. This motor consists of a casing in which spring-actuated gearing is mounted, one of the gear shafts projecting at each side of the casing and having a disk with arms adapted to detachably connect the motor with the drive wheel of the machine to be driven, the device being adapted for use with sewing machines, dentists' and jewelers' drills, etc.

Miscellaneous.

OVEN THERMOMETER.—John C. Voss, El Paso, Texas. Combined with a spindle having a lever and an index or pointer is a compound bar secured at one end and bearing at its free end against one side of the lever, the device affording an instrument for indicating the temperature of an oven, so that the fire may be regulated for different articles.

MECHANICAL TELEPHONE.—William W. Nichols, New York City. Diverging or radial flat metal plates are combined with the diaphragm, and held under constant tension in contact therewith by the line wire, to distribute the vibrations and relieve the diaphragm of strain, the line wire connection being made by a button resting centrally on the plates, a small stud or shank of the button passing centrally through the diaphragm.

WATERPROOFING STRAW GOODS.—Runyon Pyatt, Jr., New York City. This invention consists in a process of treating the goods to a bath of resin dissolved in water and sal soda, drying them, and neutralizing the effect of the alkaline solution by an acid bath, the process preserving the natural color and imparting a substantial body to the goods.

FISHING NET FRAMES.—John G. Landman, Brooklyn, N. Y. This invention relates to a hinge-screw coupling adapted more particularly for securing a collapsible scalp net frame to a handle, preferably by a ferrule, and in distended condition for use, the device being also applicable for coupling and holding firmly other collapsible structures.

FLOUR BOLT.—John Johnston, Neenah, Wis. This invention provides for the movement of the sieve in any desired direction, and for it to be carried to and fro elliptically by means of shafts, while the hanger connections provide for a proper adjustment of the sieve frame, and by adjustably connecting the crank pins the path through which the sieve is carried may be varied according to the requirements of the material to operate on. In a further patent the same inventor shows a shaking bolt having some of the same general features, with a swinging hopper apron or plate, and with different means for suspending and adjusting the apron or plate, and imparting a circular or elliptical movement to the sieve.

VEHICLE WHEEL.—John O. Leck, Glen Elder, Kansas. Clips are secured on the approaching ends of the felly sections, with spaced teeth adapted to interlock when brought together, with a wedge fastening, whereby the tire, should it become loosened, can be set without heating or shrinking, and without removing the tire from the wheel.

DOG FOR LOG CARS.—Robert J. Thompson, Grandin, Mo. Combined with the bolster or cross beam of the log carrier are dogs pivoted near the opposite ends of the beam, push bars being connected at one end to the dogs, and toggle levers connected at their outer ends to the push bars, with an

operating lever with the pivoted ends of the toggle levers, whereby the logs may be retained in position and expeditiously released.

WAGON END GATE.—William R. Watt, Somerville, Tenn. This is a simple and durable fastening for locking the end gate, the invention consisting of a shaft mounted to turn and slide in the end gate and having a fixed head adapted to engage a recess in the cleat holding the end gate.

WAGON BED.—This invention, also by the above inventor, consists of L-shaped metallic cleats secured to each side of the wagon bed and forming a guideway for the end gate, the cleats each having at its outer end a bolt passing through the bed proper, and a nut screwing on the lower end of each bolt and against the under side of the bed bottom.

HOISTING ATTACHMENT.—John F. Schultz, New York City. This invention relates to an apparatus for loading barrels or boxes of ashes or garbage into collecting vehicles, providing therefor an elevator attachment capable of being transformed into sideboards and an extra tailboard, when not in use as a hoisting device, to form an extension of the vehicle body, and prevent its contents from falling off.

SCAFFOLDING.—Adolph Bitterly, Ottawa, Ill. This scaffold is made with two triangular legs or frames, having cross rods between their ends and removable bolts at their adjacent narrow ends, with other novel features, the construction being adapted for building chimneys, plastering, painting, etc., while being easily set up or taken down and packed in small space.

BAG HOLDER.—Frank A. Brown, Angelica, N. Y. This is a holder for bags while being filled, and is made of wires bent to form two outwardly and downwardly projecting side arms, terminating in hooks, and twisted and bent in the rear, forming loops, with a back having upper and lower extensions, the device being supported in position simply by hanging it upon a nail or the edge of a bin.

HINGED HANDLE.—Jacob Gerstle, Portland, Oregon. This invention provides a hinged handle designed for attachment to frying pans and other culinary vessels, the handle being adapted to fold down in compact form when the vessel is not in use, while it can be opened out and held in rigid position by a simple movement of a sliding fastener.

SCIENTIFIC AMERICAN BUILDING EDITION.

MAY NUMBER.—(No. 43.)

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- Elegant plate in colors, showing elevation in perspective and floor plans for a dwelling costing four thousand dollars. Page of details, etc.
- Plate in colors of a summer cottage for one thousand two hundred dollars. Floor plans and page of details.
- Design for a bank building, with plan and view of interior.
- Perspectives and floor plans of an elegant residence at Bell Haven Park, in Greenwich, Conn. S. Edwin Tobey, Boston, Mass., architect.
- A mountain cottage lately erected at St. Cloud, Orange, N. J. Elevation and floor plans. Architect Mr. Arthur D. Pickering, New York.
- A dwelling at Springfield, Mass. Plans and perspective elevation. Cost eight thousand five hundred dollars.
- Engraving showing perspective elevation of a cottage erected at Roseville, N. J., at a cost of six thousand seven hundred and fifty dollars. Floor plans. F. W. Ward, architect, New York.
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- View of Aurburndale Station, Boston and Albany Railroad, with plan of station grounds. H. H. Richardson, architect.
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Notes & Queries

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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.

(872) E. T. W. asks for the receipt for marbleizing glass. A. It may be done by painting or by picking up color from the surface of water. For full description we refer you to articles on marbleizing wood and paper in Spones' Workshop Receipts, 1st series, which we can supply for \$2.

(873) W. I. L. writes: I wish to contact zinc with glass to bear considerable pull without parting. Can you suggest an inexpensive cement, composition, or any substance that will answer the purpose? A. Many receipts are given; 1 pound of shellac dissolved in 1 pint alcohol, with one-twentieth its volume of a solution of gutta percha in bisulphide of carbon, will dry quickly. A slow-drying one may be made thus: 2 ounces thick glue solution, 1 ounce linseed oil varnish or 3/4 ounce Venice turpentine; boil together.

(874) A. F. J. asks how to find the length of a chord when the length of the arc and radius is given. I want to put 16 pieces together to form a circle of 20 feet diameter. Also how to find the versed sine, and what will be the factors of the previous example? A. The best way is to do it by a table of circular

functions. Thus $\frac{1}{2}$ circle = $\frac{1}{2}\pi = 2\frac{1}{2}\pi$. Twice the sine of one-half this angle is the chord; in your problem it must be multiplied by the radius, 10 feet, giving 45 inches. The cosine of one-half of the angle subtracted from the radius gives the versed sine, in your case 4.8 inches.

(875) C. W. S. asks how many foot pounds are obtained by the explosion of one pound of hydrogen gas mixed with the right proportion of air, also how many mixed with pure oxygen. A. One pound of hydrogen gas combining with eight pounds of oxygen gas will liberate 34,170 (Centigrade degrees) heat units. This multiplied by 1409 (pound degree Centigrade equivalent in foot pounds) gives 47,940,510 foot pounds. A small reduction must be made in practice for the heat absorbed in heating the nine pounds of steam produced. The result for air will be nearly the same.

(876) E. K. asks (1) what to use to dissolve boracic acid so as to make a concentrated solution of it, to use when cold, which will not precipitate. I want to use as anti-oxidizing soldering solution for gold. They have some way of dissolving it without using hot water, because it reprecipitates. A. Use hot glyceric or alcohol. 2. What is the best analytical qualitative chemistry, that is, for all around work? A. We recommend "Manual of Qualitative Chemical Analysis," by C. R. Fresenius, \$4. 3. Can you furnish me with a watch maker's manual? A. We can supply you with Saurier's "Watchmaker's Hand Book," \$3.50, also Saurier's "Modern Horology," \$16.

(877) Punjabe asks: 1. What should be the dimensions of an electric magnet so that it would attract and pull through a space of 1/2 inch or 3/4 inch a weight of about 150 pounds? What size and weight of covered wire should be wound on the magnet? A. In the SCIENTIFIC AMERICAN, No. 19, current volume, page 291, you will find a description of such a magnet as you require. 2. How many pairs of zincs and carbons, each 1/2 in. diameter by 6 inches long, all fixed close together without touching, and connected in series, and the whole immersed in a large vessel containing the ordinary bichromate solution, would operate the above magnet? A. Your proposed arrangement of battery is not advisable, better make 6 or 8 separate cells, each having a plate of zinc 3 x 8 inches and two carbon plates of the same size, or in lieu of the carbon plates use 10 or 12 carbon rods such as you describe. 3. I have a big horseshoe magnet (compound) built up of 8 plates each 1 1/2 inch by 1/2 inch. This magnet has lost its virtue through having been thrown to one side in a large store, and so neglected for some years. A little of its attractive power remains, but is very feeble. How could I make it regain its power? I have not the means of going through the ordinary magnetizing process, but I could get the use of a large dynamo, which lights our workshop, if it would answer the purpose. This you could please let me know, and how to go about it? A. You can remagnetize your magnet by placing its poles in contact with the poles of the electro-magnet before referred to.

(878) A. B. asks: 1. What weight would field magnets of motor in SUPPLEMENT, No. 641, be capable of sustaining if used as an electro-magnet, with same current as required to run motor? A. It depends upon the amount of current used. With 6 cells of plunging bichromate battery it would probably support 100 pounds. 2. How can I make an induction coil give a direct current? A. By arranging a commutator to correct the currents as they are discharged from the coil. 3. Is the commutator only necessary for reversing and stopping the current of the induction coil? A. No induction can take place with a continuous current. 4. Would a ridge of wood left in the center (where secondary is divided) of the spool answer the purpose of the insulating material? It would be easier winding, I think. A. It would answer the purpose if boiled in paraffine or wax. 5. I have pound and a half size wire inclosed. Please state if it will answer purpose of secondary coil. A. Your wire will answer, but it is rather coarse. 6. Please give me the address of some reliable electrical supply company. A. Consult our advertising columns for dealers in electrical supplies.

(879) Interested writes: 1. I have a gold ring which has been near sulphur; the latter darkened the ring, in the engraving particularly so. What shall I do to restore it to former color without injuring stone, which is a cut "tiger's eye"? A. Polish with a brush, using whiting, soap, and water. 2. Is there any simple preparation that can be put on a photographic proof to prevent its fading? A. Soak in solution of hyposulphite of soda. It should properly be toned, but is generally not dark enough to give good results. Many formulae for toning have been given in our columns and in the SCIENTIFIC AMERICAN SUPPLEMENT. 3. I had a receipt for silver ink, but cannot find it. Can you give formula [for same]? A. Rub up silver leaf or silver bronze powder with honey and water.

(880) E. M. writes: I have made a Wimshurst machine, described in SUPPLEMENT, No. 548, which works splendidly, but the cement in setting cracked the glass; could you give me a formula for a satisfactory cement? A. Use the same cement, but interpose a piece of thin leather between the glass and its support. The leather should not be saturated with the cement, as it would when hardened render the leather very rigid.

(881) E. S.—You can run the dynamo described in SUPPLEMENT, No. 600, by means of horse power, by charging a storage battery, provided you are able to keep up a moderately even speed. It will take about 5 or 6 hours to charge the battery. For information on secondary batteries we refer you to Reynier's Voltaic Accumulators, price \$3.

(882) N. T. G. asks (1) what ingredients compose the liquid ink eraser used for erasing blots, etc., from paper. It is used with a camel's hair brush, and consists of one or more kinds of acid. A. We do not know the particular eraser you refer to, but you can thus use a solution of oxalic acid in water, removing the liquid from paper with a blotter, and making one or two applications. 2. A receipt for making solder, that we find sold by agents through the country, for

home use. The solder is melted with a common match. A. The fusible metal solder sold by peddlers is made with 50 parts tin, 25 parts lead, 25 bismuth.

(883) A. J. R. asks: What is the cheapest way to transmit 5 horse power 150 feet, to use it cutting feed to fill a silo? I use it but a few days each year. A. For only temporary use the cheapest means of transmission is by a rope 3/4 inch or 1 inch (a tow line) running over grooved pulleys 3 or 4 feet in diameter. The pulleys may be made of pine wood and clamped to the driving shaft and to the machine shaft. When not in use the rope can be taken off and stored safe from the weather.

(884) J. W. B. - Stains on a ceiling should be carefully scraped enough to take off the old whitewash, and washed with clean water before re-whitewashing. Then whitewash with good white lime water with a little white glue dissolved in the water. An ounce of glue to a pail of whitewash is sufficient.

(885) C. W. G. writes: I have a griddle which I clean every morning with sapollo and a scrubbing brush, rubbing 15 to 20 minutes. The face is full of small ridges left from the grindstone. What can I use that will give it a smooth face? A. Rub the metal with a piece of leather wet with flour of emery and water, and finish with ground pumice stone on a cloth.

(886) J. E. L. writes: Will you let us know of a simple method of preparing chloride of silver, and how the powdered form is changed into a solid that can be moulded? A. Dissolve silver coin in nitric acid, warm the solution, and add hydrochloric acid and filter. The solid matter is chloride of silver. The filtration should be done in a room as near dark as possible. Allow it to dry in the dark. When all moisture has evaporated, it can be melted at a low red heat and cast into any desired shape in a mould. The mould may be of various materials, iron, clay, or even paste-board if the heats kept low.

(887) F. S. M. asks: Would a plunge battery of four cells, with a capacity of 1 1/2 quarts of fluid per cell, and with zincs and carbons 5x6 inches, furnish any more power to run a motor if changed into a battery of eight cells of half the size per cell? What is the best way of connecting up the cells to get the most power? A. The proper arrangement of the cells depends on the motor used. The four cells arranged in series should work an ordinary small motor very nicely. Do not divide the plates and produce the eight cell battery. Procure a low resistance (1 to 2 ohms) motor and use the larger cells.

(888) C. E. P. asks how and by what process I can extract aluminum from the clay. I am a miner, and we run off large quantities of clay, and I might at the same time save the aluminum with perhaps a small extra expense. A. Aluminum can be extracted from clay by the use of metallic sodium or by the electric furnace. There is no way practicable for you, as it is an expensive and difficult operation and only available for experienced chemists. Richards on Aluminum gives details of processes; this we can supply for \$2.50 by mail.

(889) R. M. P. - Ordinary house refrigerators use about 200 pounds of ice per week more or less. The drainage is through a half inch pipe sealed. For a ten or twenty thousand pound refrigerator a 2 inch pipe with seal is large enough. There is nothing suitable for the inside of refrigerators but metal, which may be zinc or galvanized iron, of which a deflector and drip trough may be made to catch the water of condensation falling from the bottom of the ice chamber.

(890) W. D. M. - The force of the tidal motion on the flow and ebb are contrary and balance each other. There is no known change in the earth's rotation from tidal causes.

(891) F. McF. - Violin varnish: Dissolve 12 parts sandarac, 6 parts shellac, 6 parts mastic, 3 parts elemi gum, in 150 parts alcohol. Warm when dissolved and add 6 parts Venice turpentine. Color to match the old varnish with Brazil wood and dragon's blood gum.

(892) H. M. writes: In forcing water through a hose will the pressure be the same at the discharge end as at the pump end? A. The pressure will not be as much at the discharge end of the hose as at the pump. The motion of the water through the hose causes friction, which retards the flow. When the end of the hose is closed, and with no movement of the water, the pressure is alike at both ends on the same level.

(893) O. A. P. - For a colorless lacquer dissolve bleached shellac in pure alcohol, settle and decant. Make the lacquer very thin. The usual lacquer for brass is made with ordinary shellac and alcohol made very thin, settled and decanted.

(894) E. D. asks: Will men peddling inkstands on commission have to pay a city or borough license or tax? A. Many towns or counties require peddlers to take out license. In some States, a State license is enforced, though this has been the subject of many suits, and has been declared unconstitutional except as a police regulation enforced alike upon citizens of the same and other States.

(895) F. R. asks the ingredients used, and in what proportion, in making hard oil finish. A. Hard linseed oil varnish is made with 750 parts linseed oil boiled with 150 parts litharge and 90 parts pulverized minium. Boil until it turns brown, then add 500 parts pulverized amber melted in 60 parts linseed oil. Boil and stir for a few minutes, cool, settle, and decant the clear varnish.

(896) J. H. A. asks: What is the composition of the skin colored material which dentists use in making artificial teeth? A. Pink celluloid or xylonite. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 227.

(897) J. B. S. - The height of the atmosphere is supposed to be about 50 miles. It is not positively known. The highest point jet attained by a balloon is about 5 miles. The thinnest sheet copper that is made is about 0.007 inch thick (33 wire gauge) and weighs 2.88 pounds to a square yard. Its breaking strain is about 2 1/2 pounds to one inch width.

(898) F. G. D. - Steel springs are tempered in oil and reheated with oil on the surface until the oil blazes, then cool in oil. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 20, "How to Make and Temper Springs."

(899) A. P. asks: Is it possible to hatch 13 perfect chickens from 11 eggs? A. Yes. Twin chicks are occasionally brought out. They generally die young.

(900) J. A. S. asks whether there is any chemical known that can disguise the smell of kerosene and not impair its action as a washing agent in the boiling of clothes. A. No such agent is known. Kerosene can be subjected to additional purification with bichromate of potash and sulphuric acid.

(901) C. T. E. writes: 1. I spilled some kind of chemical upon some cloth goods (probably sulphuric acid) which left a vermilion stain. I applied some India ink and succeeded in removing the red color, but left a shiny spot which showed through the ink, the chemical leaving a glaze. Is there anything I could use to remove the greasy-looking glaze so produced? A. Wash the spot with ammonia and water. 2. What will bleach out an ordinary finished photograph, leaving ink lines which have been drawn over the picture? What is a silver print? A. Solution of mercuric chloride (corrosive sublimate).

(902) C. G. asks: 1. Is black a color? If it is not, how is it proved? A. Black is the absence of colors. This is evident, because when light, the source of all colors, is withdrawn, the eye is affected by blackness. See SCIENTIFIC AMERICAN, vol. 56, p. 137. 2. Is there anything that if you put it on your bait while fishing, will draw the fish? If so, what is it? A. We know of nothing that has any real value for this purpose. 3. What is smalage? A. A name for celery (Apium graveolens).

(903) H. J. S. asks (1) how to make a liquid that will oxidize silver a glossy black by dipping small silver articles in the liquid. A. Use a solution of sulphide of potassium; polish metal before, and rub with a soft rag or chamois after immersion. 2. How to make a liquid that will oxidize copper or oroid by dipping, to imitate bronze? A. Use the same bath, but have it quite dilute. If for outside work simply oil with olive oil, and let the weather do the rest.

(904) M. H. & Co. ask for a recipe for making artificial cider. A. We give two formulas: a. 25 gallons soft water, 2 pound tartaric acid, 25 pounds dark brown sugar, 1 pint yeast. Put in a clean cask with the bung out, and after 24 hours stir them well together. Add 3 gallons spirits, bung up the cask, and leave for 48 hours. b. Water 100 gallons, honey 5 gallons, powdered catechu 3 ounces, alum 5 ounces, yeast 2 pints. Ferment for 15 days in a warm place, in sun if possible, then add bitter almonds 1/2 pound, cloves 1/2 pound, burned sugar 2 pounds, whiskey 3 gallons. If too sharp add honey or sugar, if too sweet add tartaric acid.

(905) H. P. B. asks (1) whether Portland cement or plaster of Paris would not do (for light work) in making the gas furnace described in SCIENTIFIC AMERICAN of May 4, 1889, page 279. A. Nothing is a good substitute; try to get pipe clay at the drug store; try mixing wood or coal ashes and sand with as little Portland cement as will hold it together. 2. Which of the previously named substances would give the best result, as clay is not available? A. Of the two, Portland cement is the best and may answer for low heats.

(906) J. B. O. - The powder sent may be a natural deposit of infusorial silica. Use powdered pumice stone as a polishing and cleaning agent and you will get probably equal satisfaction.

(907) Theo asks what to use to remove tan or sunburn. A. The following is recommended: 6 drachms avds. powdered borax; Price's glycerine 3/4 ounce; use water or elder flower water 12 ounces; mix. We doubt the efficacy of any application except such as will cause the outer layer of the skin to strip off, such as the extract of cashew nuts. Even such a violent application does little good if the skin is re-exposed to the sun, as sunburn and freckles are liable to return as badly as ever.

(908) S. D. M. J. Co. writes: Please give us in your Notes and Queries a recipe to strip nickel off nickel plated goods. A. Use strong sulphuric acid 4 pounds, nitric acid 1 pound, water 1 pint. The mixture must be made gradually, adding the sulphuric acid first to the water, and adding the nitric acid after it is cool. The articles must be carefully watched and must be removed from the bath the instant the nickeling is stripped.

(909) S. K. A. writes: A certain writer says: "We were in a kind of chrysalitic condition." He refers to the state of a chrysalis. 1. Is his use of the word chrysalitic proper or sanctionable? A. We should be inclined to admit the word and the use made of it as allowable. "Chrysalid" is given by Webster as the adjective. 2. In good usage, is it proper for a compositor to divide the word Worcester at the end of a line, Wor-, carrying the balance of the word over to next line, as though it were a three-syllable word? A. Yes. 3. Can you refer me to any standard authority, in book form, on correct punctuation and the best usage of the English language, that would be an aid to compositors? A. We refer you to Hill's Manual of Social and Business Forms, \$6; also Roget's Thesaurus of English Words and Phrases, \$2.50, which we can send by mail.

(910) F. W. asks: In SCIENTIFIC AMERICAN, May 18, page 314, No. 799, you state how to preserve wood; would the sulphate of iron do for shingles? I have to lay about 50,000 hemlock this year. I think the tar would be too dangerous? A. We should not feel inclined to recommend iron sulphate, as repeated rain-falls would tend to wash it out. For shingles something more insoluble would seem better.

(911) J. B. asks: 1. How much pressure will mercury exert in a tube 1/2 inch diameter and 10 inches long, through expansion? A. There is hardly any limit assignable. As the heat increases the pressure will increase until it would burst almost any tube that

did not expand as rapidly as itself. Thus for a change of temperature of 10° F. in a non-expanding vessel, mercury would exert a pressure of 2,850 lb. to the square inch. But as the containing vessel would expand with the heat, the absolute pressure would be somewhat less, but still very great. 2. Is there any solid that becomes heavier by immersion in water? A. No. 3. What would be the cost of the magnet described in SCIENTIFIC AMERICAN of May 11, 1889? A. About twenty-five dollars if you do some of the work yourself. 4. Is there any electric motor that is suitable for running sewing machines, and about what would they cost? A. For such a motor, see our SUPPLEMENT, No. 641, which we can send by mail for 10 cents.

(912) H. W. S. writes: 1. In case of a knot falling out of a board in a fence, is it caused by the board drying and shrinking away from the knot, or the knot drying and shrinking away from the board? A. We believe it is due principally to shrinkage of the knot. 2. If a hole was bored in a dry board, when the board became water-soaked, would the hole become smaller or larger in diameter? A. The hole in the wet board we should expect to find larger than when the board was dry.

TO INVENTORS.

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