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Notes & Queries

A. asks how to make a touchstone for testing gold.

T. F. asks: What other ingredients mixed with hydraulic cement and plaster of Paris will make a hard and fixed lining for the hollow iron shafts of mantels?

J. N. F. asks: Is there a soft white metal, that will not rust, as cheap as common gray iron? Something similar to white clothes line metal is wanted.

W. H. M. says: I have a mirror, and the heat of a stove has affected the glass so that it is worthless; there seems to be a blur over it, and it looks as though it were covered with dust. Is there any way to restore it?

J. H. F. wants an instantaneous black walnut stain for soft woods. "I want to slip the pieces into the stain tank and let the stain strike in as they drain on a rack."

J. S. C. asks for information respecting a plant or fungus known in the South as California moss or beer moss, used for making molasses beer. Would the beer be deleterious to health?

A. K. asks: Is there a book published on phosphorescent compounds?

E. J. B. asks (1) how to put a polish on steel or iron, such as there is on a chisel or butcher's knife. 2. What is a good preventive for rust, for use on bright articles exposed to open air? 3. How are locks japanned giving them such a hard glossy color?

Answers to Correspondents

A. will find recipes for Worcester'shire sauce on pp. 249 and 351, vol. 26, and one for waterproof blacking on p. 90, vol. 26.—R. C. will find the description of Hugo Tamm's manganese process on p. 21, vol. 23.—L. S. C. can temper mill picks by following the directions on p. 106, vol. 25.—A. B. can harden set screws and similar articles by using the process described on p. 90, vol. 26.—J. G. D. can find processes for tempering steel in many of our recent numbers. We cannot repeat them so frequently as many of our correspondents seem to desire.—J. W. T. is correct; W. A. J. made an error.—C. S. P. will find directions for kalsomining on p. 351, vol. 24.—H. S. can make Pharaoh's serpents by following the instructions given on p. 410, vol. 23.—A. N. will find a cement for china described on p. 346, vol. 24. Try your perpetual motion, and get the water up your siphon, if you can.—B. W. Jr. will find an account of the method of raising pearls on p. 305, vol. 26.—A. J. A. and C. T. B. should read H. C. Baird's advertisements in our journal.—P. T. R. will find an answer to his queries about magic lanterns, etc., on p. 27, vol. 23.

E. M. G. and others ask us for a rule for proportioning screw cutting gears. Answer: Multiply the screw on your lathe and the thread you wish to cut by given number. If you want 10 threads to the inch and your lathe screw is 4 threads to the inch, multiply by 8, 10, or 12. The result will be 80 and 32, 100 and 40, 120 and 48, and so on.

J. A. G. & Bro. ask: What is the decision of the Supreme Court referred to on p. 336, vol. 23, in regard to rights of assignees under extensions of patents? We do not find it given in present volume. Answer: The article on p. 336 says: "We published last week." Look on p. 328.

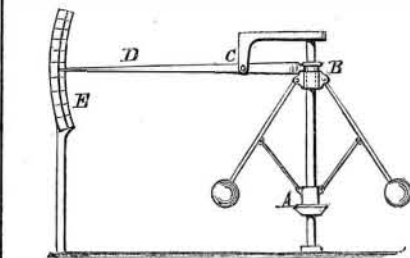
J. E. E., of Pa., asks: Will some one give the scientific cause of the light produced from lightning bugs and light wood. In a dark night I have held a lightning bug to ascertain the time by my watch, and often wondered what produced it. Is it electricity like the electricity produced by stroking a cat, more distinctly seen from a black cat? Electricity would not seem to be the cause of light in light wood. In either case, it would seem that the sun is not the only source of light unless it is held that as it is the source of all life (both animal and vegetable) these light sources could not have existed without the sun. Answer: The light produced from lightning bugs and other insects is due to the secretion of phosphorus in the form of a substance termed noctilucine. It is secreted by a special organ, just as bile is produced by the liver. Noctilucine can be obtained from the bugs mentioned, from glow worms, from phosphorescent marine animals, from decaying fish, flesh, light wood, etc. Thus obtained, it yields light by contact with air, the phosphorus being thereby oxidized. In Science Record for 1873, at page 467, an interesting chapter on this subject is given.

P. S. A. says, in answer to a great many queries on cutting old files: Acid is a good means of cleaning old files, and there it ends. It will destroy any cutting edge that may have been left on the files. The only way to renew old files is to send them to a file manufactory, have them annealed, ground out, and then cut as if the blank were new. If the steel in the files is good and the blanks heavy, this will give satisfaction. Acid has done more to condemn the recutting of files than all the poor work that has ever been put on file blanks.

T. S. S. says that E. S. can remove iron rust from tools by using carbon oil. Apply it, and in a few hours rub it with fine sand paper; it will lift it off or remove it immediately.

J. S. C. asks: What is the oil of rhodium? Answer: No such substance is mentioned in the pharmacopoeia. A correspondent once informed us that a quack recommended its use, and then offered to sell the stuff at a very high price.

A. A. N. (1) encloses a sketch of a machine for measuring the velocity of the wind, and asks: Will it work? In its governor, similar to that in an engine, is attached to a common windmill. A and B are sleeves that revolve around a spindle. B slides up and down,

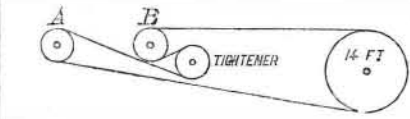


while A does not. At A is a bevel wheel through which the motion is communicated from the windmill. A disc arm or pointer pivoted at C, and also to the sleeve at B; while the other end moves over the graduated part of a dial, E. As the balls rise or fall, by the force of gravity overcome by centrifugal force, the sleeve B rises and falls also, and with it the end of the pointer, D. If it will work, how can I graduate it? How can I find the position of the pointer when the wind blows at the rate of 10 miles an hour? 2. How can I whiten blocks for engraving, so that pencil marks will show? I have used the white oil of cards until my cards are all gone. Answers: 1. The contrivance described by our correspondent is not novel. It will work, if the scale can be graduated; and this can only be done by experiment. There are many anemometers, or instruments for measuring the velocity of the wind; but we do not know of any that record it with perfect accuracy. 2. Use Chinese white, in the form of fine powder, and apply it to the block with the finger.

A. C. S. asks: Which is the most economical style of boiler to use, say to the amount of 100 horse power? Answer: Your choice would probably lie between the locomotive or tubular, and some form of the sectional boiler. We could not give you any definite advice, without knowing more of the circumstances of the case. We would also say, in this connection, that these columns are for matter of general interest to all our readers. Special suggestions as to what particular machines to use in individual cases cannot be given here. Information of this kind should be obtained from some reliable consulting engineer. Your other query, as to bevel gears, was answered on page 11 of our current volume.

J. H. K. says: A friend says that the cross-head connected with the piston rod of a locomotive moves forward in the guides and remains stationary until the guides slip the length of the stroke, then forward again. My idea is that the cross-head moves backward and forward in the guides. He also says that the piston rod moves forward twice as quick as the guides slip the length of the stroke. It is understood that the wheels do not slip. Answer: Probably you and your opponent are looking at the matter from different standpoints. If the driving wheels do not slip, the whole locomotive, and consequently all the moving parts, go forward at a greater speed than the piston travels in its reciprocating motion in the cylinder. Consequently the cross head and piston rod are constantly moving forward with reference to a fixed station, such as a telegraph post, on the line.

W. A. P. says: We have a 40 horse engine fed by two 50 horse tubular boilers, and we burn about eight tons of coal per week, besides all the fuel made by our wood working establishment (which is enough to run most engines with the same amount of power that we use). The following will illustrate the situation. The engine makes 60 revolutions, and the distance



from the engine to main shaft, A, is about 100 feet. 1. Do we lose power by the long distance the power is transmitted? 2. Does it take more power to drive the intermediate counter, B, by the same belt than it would by belting back with another belt? 3. Could we get more power by moving the engine nearer the work, and carrying the steam through pipes? 4. How much would be lost by condensation if the pipe were well protected? 5. Do you think wire rope could be applied to advantage? Answers: 1. Yes. 2. Yes, if you could drive the countershaft with a smaller belt. 3. Yes, if the pipes were properly protected. 4. Probably not more than 3 per cent, if the connection were straight. 5. We would advise you to correspond with the manufacturers.

M. A. G. asks: What is bay rum? How is it prepared, and what are its uses? Answer: It is an alcoholic spirit distilled from the leaves of a species of laurel termed "bay tree"; extensively used on account of its peculiar and pleasant flavor by apothecaries.

S. A. asks: What is the best metal to use on the bottom of a small steamer in a southern or tropical climate? She is to carry about 30 tons, and to draw about 4 feet when loaded, and to be used to tow vessels at times. We have a boat of iron; but the bottom has to be painted every 7 or 14 days, as the paint is rubbed off in crossing a sand bar from 2 to 6 times every day. We have thought of using heavy zinc plates below water line and sheet iron above; would they be durable? 2. What would be the best kind of tubes for an upright boiler, iron, brass, or copper, when salt water is used as feed for boiler and wood as fuel? Answers: 1. A light sheathing of wood, covered with copper, would answer very well. The wooden sheathing should be double. 2. Composition tubes would probably be the most durable for your boiler.

G. G. asks why lithographic pictures can not be transferred by the Willis' process, described on p. 369, vol. 23. Answer: The Willis process refers to photographic pictures only.

A. M. asks for an explanation of the word "penny," as used to describe the sizes of nails, fourpenny, tenpenny, etc. Answer: It is a corrupt one. "Four pound," "ten pound," etc., is correct, and signifies the weight per 1,000 of the nails.

A. R. asks what are the number and dimensions of the tunnels and bridges on the Erie canal. Answer: The bridges are all 11 feet or more from the water. The published statements do not give their number.

C. E. H. says: I am building a small locomotive, and I fear my boiler will be too small. The dimensions of the cylinder are 21x18 inches; the boiler's length, not including smoke arch, is 30 inches and diameter 8 inches. Inside of fire box is 6x7x7 inches. There is one flue 2 1/2 inches in diameter. The boiler is of 16 ounces copper. If any boiler is too small, can you suggest any way to remedy the evil of insufficient steam? Answer: You can reduce the diameter of cylinder by bushing it, or shorten the stroke by making the heads fit into the cylinder for some distance. By either method, you can get engines proportioned to the size of the boiler, without changing many of the parts.

G. P. S. says: I am a fireman on one of the dreadnoughts, and all that I can do will not keep the hot brass from turning blue. I have used acid in almost every form, but with little success. Answer: Fine emery and oil, well rubbed in, will polish most brass work, but we are not sure that they act as specifics in every case.

A correspondent encloses a specimen of a grass growing largely in Mississippi, and asks: 1. Has it any commercial value? 2. The yellow pine tree of this country was never known to bud or sprout out from the stump after the tree was cut down, the stump dying and decaying very nearly as fast as the log; but there is a spot of land, in this place, of about five acres, that is thickly covered with pine, cedar, oak, and sweet gum trees, where about ten years since there were about a dozen of the pines cut down. The stumps have remained perfectly green, and the sap has continued to rise and fall yearly ever since; yet there are no sprouts or buds springing from them. Answers: 1. The grass might possibly be used in the manufacture of paper. Its commercial value would depend upon the cost of its preparation for the market. 2. If it is really sap that rises and falls in the pine stumps, we cannot account for it. But if the stumps are in a locality where they are kept continually wet, that would account for their preservation.

J. W. asks: Is there any simple and inexpensive method of forcing water through a small tube say three sixteenths inch bore, after the manner of a fountain? For instance, suppose I have a tank 3 inches deep that will hold a quart.

how can I force the water through the tube 6 inches above the level of the water in the tank? By placing the tank a foot above the top of the tube, I can get pressure enough, but that will not answer; I want to force it through the tube from below and have pressure enough to cause it to flow through a pin hole in the nozzle to the height of an inch. Answer: You can do it by employing compressed air in your reservoir; or you can easily make a "Hero's fountain," as represented in the sketch. The operation of this fountain is as follows: The vessel, A, is first filled with water up to the top of the pipe, E. Then, by pouring water into the basin, C, the air in the vessel, B, is compressed, and the water in the vessel A, will be forced out through the jet, F, to a height corresponding to the length of the tube, D, less the friction of the water in the discharge pipe.

G. K. asks: 1. Can steel be cast, as cheaply as forged, and of as good quality? 2. Is there a liquid, oil or spirit, that will not freeze, congeal, expand, or contract between 0° and 112° Fahr.? Answers: 1. Yes. 2. There is no liquid known to us that will not expand or contract by heat and cold.

T. C. W. says: Covington, Ky., has as fine water works as can be found in the United States. They are on the Holly system, and all the water is pumped out of a well on the bank of the Ohio river. The water is perfectly clear and has a good taste, but it is too hard. People cannot wash with it, even after it has been boiled. What shall we put in the water in order to make it fit for washing? A recipe to soften a barrel full of water at a time will oblige. Answer: Put in just enough milk of lime to take up the excess of carbonic acid, when the insoluble carbonate will be precipitated.

B. S. asks: What is the best method of bringing water from a spring about a mile distant? The fountain head is about 15 or 20 feet higher than the reservoir. I would like to know whether wood, iron, cement, or pottery tubing would be the best. Answer: Wooden pipes would be the cheapest. They are well suited for conducting water.

S. H. N. asks if aluminum can be soldered or brazed to itself or any other metal, in such a manner that it will stand a twisting or bending pressure as well as any other metal. What flux must be used? "I can solder it, but not so as to stand the required strain." Answer: A good solder for aluminum has not yet been invented. Gold can be employed, we suppose, but cannot tell what strain it will bear. One great disadvantage attending the use of aluminum in alloys is its tendency to make them brittle.

W. P. asks: Is there any difference in the draft of a tug boat drawing a vessel or not, the tow line to be horizontal? Answer: We have an idea that the draft will be increased, up to a certain speed, when the tugs towing a vessel. Perhaps some of our readers who have made observations on this matter, will favor us with communications.

S. A. asks: Has vacuum any immediate action on the piston of an engine? Answer: Vacuum produced on one side of the piston of an engine, has precisely the same effect as an equal amount of pressure applied to the other side of the piston.

J. G. R. asks: How long does a current of electricity take to cross the ocean on the cable? Answer: One quarter of a minute is the time required to make an intelligible signal on the cable.