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 This is for our information and not for publication.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.

(8349) L. K. asks: We want to build a 2 or 3 horse power motor to run a lathe, etc., on a 500 or 110-volt current, and can find no such machine described in your index. Can you let us know where we could obtain such a description? A. We can furnish you a book called "Electrical Designs," price $2 by mail, which contains the sort of machine you wish.

(8350) W. E. H. writes: In reference to the electrical ignition on the gas engine described in the book, "Gas Engine Construction," by Parsell and Weed, I would like to ask the following: What would be the objection to connecting one of the wires of the primary circuit (on page 230 of above-named book) direct to some part of the engine, and making the pin, which projects from the hub, of steel, the spring, *e*, remaining insulated from the rest of the engine? It seems to me that the platinum ends of the spring could then be dispensed with, as the surfaces would remain bright and contact assured by the continual rubbing. A. The sparking break device described is in use with good results, but the use of steel surfaces subjects the contact points to wear, which may change the ignition time. There is no objection to the method of connection; but we advise the use of platinum contact points on both pin and spring.

(8351) H. R. asks: Have you one or more SUPPLEMENTS showing the construction of a simple electric motor that could be run with the power from an incandescent light wire. A. We have no plans for motors to be run upon a lighting circuit with 110 volts in our SUPPLEMENTS. You will find such in the book "Electrical Designs," which we can send for $2 by mail.

(8352) L. D. asks: Would like to know through your paper if the engineering courses are reliable which are advertised by the correspondence schools. Can a graduate of either of the courses satisfactorily fill a position as engineer? A. We must say in response to your inquiry that it is not the school which makes the successful engineer, but the student. A good school cannot make a successful man of a poor student; and a poor school will make a successful man of a good student. There are many unsuccessful men who have the diploma of our highest universities, and there are great men who, when they give the name of their college, have to tell you where it is. You never heard of it. It is so unknown. We esteem the school you name as very good of its kind. If your circumstances only allow you to take correspondence work you can do well through this school.

(8353) J. E. M. writes: I am interested in an organization which meets in a hall the acoustics of which are very unsatisfactory. The size of same is about 60 x 35, and about 15 feet high—a square room. Can you advise any way by which the acoustics could be improved? If you can favor me in any way in this respect you will not only confer a favor, but will do us a great deal of good in our work. We thank you in advance. A. This difficulty has been recently the subject of a note in these columns. Please refer to Query No. 3334 for directions how to proceed to remedy your difficulty.

(8354) H. F. M. asks: 1. Which of the two formulas, MV^2, or $\frac{1}{2}MV^2$, expresses the kinetic energy of a moving body, M being its mass and V^2 the square of the velocity? A. $\frac{1}{2}MV^2$. 2. What is the exact equivalent of the grain in fractions of the gramme and vice versa? A. One grain equals 0.0647989 gramme. One gramme equals 15.43234874 grains. These are exact to 7 and 8 places of decimals, but it is not necessary to be so exact. It is not common to go below four places of decimals. 3. Give me the correct chemical formula of picrate of potassium. A. $KC_6H_2(NO_2)_3O$. 4. How is the power of an explosive to be figured out from its formula? A. By finding the number of volumes of gas which can be produced by the combustion of the substance. This, at 15 pounds per volume, gives the pressure.

(8355) C. C. A. asks: 1. Is there any acid in which tin will dissolve? A. Tin dissolves readily in hydrochloric acid, slowly when boiled in dilute sulphuric acid; also in concentrated sulphuric acid with different reactions from what takes place in the dilute acid, and in dilute nitric acid. Acetic acid (vinegar) slowly dissolves the tin from the dishes in the kitchen. 2. Any in which aluminium will dissolve? A. Hydrochloric acid dissolves aluminium, even when the acid is dilute. Sulphuric acid, when hot and diluted with water up to 3 or 4 parts, will dissolve it. So does nitric acid when concentrated and boiling. 3. Do you know of any firm selling coherers, separate (for wireless telegraphs)? A. Probably any dealer in physical apparatus can supply you. 4. Have you any SUPPLEMENT containing the Hertzian wave theory, and his apparatus, such as transmitter and receiver? If so, what number? A. We have just published a valuable article upon "Electric Waves" in SUPPLEMENTS Nos. 1318, 1319, and 1320, price ten cents each. Also one upon "Wireless Telegraphy" in SUPPLEMENTS Nos. 1328 and 1329, price ten cents each. These deal with "Hertzian Waves." Wireless telegraphy has developed since the lamented death of Prof. Hertz. There is probably very little, if any, apparatus which he designed in use at the present time.

(8356) A. T.: Machine cut nails were first made in Providence, R. I., in 1775 and improved during the last years of the eighteenth century. The first cast-iron plow-share was made in New Jersey in 1797.

(8357) C. L. G. asks: Can motor described in SUPPLEMENT No. 759 be run as a dynamo? If so, how many 16-candle-power lights will it burn? Please let me know what changes would be necessary to make it a dynamo? A. The little motor of SUPPLEMENT No. 759 is run by 4-6 cells of plunge bichromate battery. If it would generate as a dynamo upon running it by power you would get nearly the same current as the battery would give. No changes are needed to make it into a dynamo. It may not, however, generate at all as a dynamo. It is a very little machine. It will not light a 16-candle-power lamp. It has not voltage enough.

(8358) C. R. B. asks: 1. What do you consider the best soldering flux for soldering electric wires, outside and inside? A. Rosin is the best flux for soldering copper or iron. Next to that, and much easier of use, is some one of the soldering pastes which can be had from dealers in electric light supplies. 2. In any certain dynamo upon what will the voltage of that machine depend—speed of armature, strength of field, or both? If the latter, will the strength of the field depend upon the current passed through it? A. The voltage of a dynamo is determined by the rate at which lines of force are cut—100,000,000 lines cut per second produces one volt. One ampere-turn produces one line of force. The number of turns of wire upon the field magnets multiplied by the number of amperes flowing through the field circuit gives the number of ampere turns of the field. The number of turns on the armature active at one time multiplied by the number of revolutions per second gives the number of times a line of force of the field is cut per second. The product of the number of lines of force by the number of times a line is cut per second divided by 100,000,000 gives the voltage. Hence, the voltage of a dynamo depends upon the number of turns in the field, the current which flows through the field, and the speed of the armature and the number of turns of wire upon the armature. 3. What is the chief difference between a Bell telephone and the independent 'phones? A. Anyone may make apparatus upon which the patent has expired. The fundamental patents upon the telephone expired some time ago. Patents upon many minor parts of the telephone are still in force. Whoever owns such a patent can enforce it. Most makers of telephones have some part of their instruments covered by a patent; other parts are common property owing to the expiration of the patent covering that part. We are not able to specify any chief difference between one telephone system and another. 4. Can you give me a scientific reason for the following phenomena: In our country the surest sign of an approaching rain is that springs will begin to run and the creeks will begin to ooze water. It is a peculiar, but sure sign. A. This is certainly a peculiar sign. We have heard people maintain it before, but see no reason for it. 5. Fuses for telephones, etc., are marked thus: ¼ ampere, etc. Does that mean they will burn out at ¼ ampere, or that they will carry no more than ¼ ampere? A. A fuse is rated at the current it will carry with safety. Most fuses will stand overload without melting. Some have been found to carry double the load they were marked to carry. Much depends upon the exposure to the air. If a fuse has a current of air passing over it, it will not heat as much as if it were in a closed place.

(8359) N. J. F. asks: Have two alternating-current fan motors. If they can be run on direct current kindly let me know. A. To run a fan upon a direct current requires a commutator upon the shaft of the armature in place of the rings which are to be found there when the motor is to run with an alternating current.

(8360) G. T. F. asks: Will you kindly inform one of your interested readers if there is any chemical or chemicals more sensitive in changing color through the different stages of the atmosphere than cobalt chloride, and what it is? A. Other salts of cobalt possess the same property.

(8361) A. D. asks: I desire to make a small alternating-current induction motor of about ⅛ horse power and would like some information on how the field is wound, how the armature is made, etc. Can you give me the desired information in the SCIENTIFIC AMERICAN? A. The plans for a small single-phase induction motor are to be found in the book of "Electrical Designs" recently published, which we can send you for $2 by mail. You will find this a very valuable work.

(8362) P. W. B. writes: 1. How great a pressure can be raised safely by either naphtha or gasoline? (Not by exploding them.) A. Any pressure that a vessel or tube will bear within its factor of safety from rupture, can be applied to naphtha or gasoline without fear of explosion or increase of pressure by change in the constituents of the fluids. 2. If 5 or 6 parts of air accidentally get mixed will the danger from an explosion at three-fourths the limits for pressure and temperature amount to anything? A. There is no danger of explosion from naphtha vapor and air mixture at any pressure, if temperature is below 400 deg. F. Sudden compression to 200 pounds is dangerous, because the heat of compression raises the temperature to 650 deg., at which the mixture becomes spontaneously explosive. 3. What per cent of air will mix safely with the gas for the limit of temperature and pressure, and also for three-fourths the limit? A. One part gas to 4 parts air and 1 part gas to 15 parts air are not known to be explosive. Any mixture between those above named is uncertain as to the limit of temperature of ignition. We know of no experiments as to the limiting temperatures and pressures. 4. Can the pressure be raised to 1,200 pounds, with naphtha or gasoline? A. Yes, any pressure for the liquid and also for the vapor, which will condense at very high pressure only, with moderate temperature. 5. Will the gas alone of naphtha or gasoline contained in an air-tight vessel explode if the temperature gets too high? What will happen then? A. Gas or vapor alone will not explode at high temperature; at red heat the vapor will be converted into a permanent gas, and like any other hydro-carbon gas will burn in the atmosphere or become an explosive when mixed in the proper proportions with air. 6. If an explosion occurred by mistake how great a pressure would probably be created? A. About 300 pounds per square inch if not under great compression previously. Add the previous compression to 300 pounds for the initial force of explosion. 7. What heat will copper tubing (1 inch inside diameter, of standard thickness) stand before weakening? A. About 700 deg. F. 8. If there is from 400 to 500 pounds pressure inside the tubing, what will be the limit of safety as to heat? A. About 700 deg. F. for a copper tube ⅛ inch thick. 9. What is the limit of safety of both heat and pressure in the same tube at one time? A. A seamless copper tube as above should stand 1,000 pounds per square inch at 600 deg. F. and under. 10. what will be the limit of temperature said tube will stand if there is only gas in the tube at from 400 to 500 pounds pressure? A. From 700 to 800 deg. F. 11. What will be the limit of temperature said tube will stand if there is both a liquid and a gas in the same tube at from 400 to 500 pounds pressure? A. The kind of material will make no difference in regard to strength and temperature at the above pressures unless by the evaporation of the liquid a very much greater pressure is generated. The temperature limit will then be as before stated. 12. Is there a tube of any sort made which will transmit heat in great quantities and that will stand a pressure of from 600 to 800 pounds which will stand a temperature of over 1,000 deg. F.? A. We can only suggest an alloy of copper and platinum, or platinum alone. 13. Will other sized copper tubing have the same strength and qualities? A. The resistance to pressure of copper or other tubing is inversely as the diameter with equal thickness. The resistance on a tube of a given size is also nearly proportional to the thickness of the tube walls.

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