ondary coil is of No. 36 silk covered wire, 5,000 feet of it being used. I can detect a very slight residue of magnetism in the iron wires when the current is not passing; should this be? The shock is far from strong. What is wrong? What ought I to expect from such a coil if I add 5,000 feet more to the secondary coil, and a good condenser? A. It would be difficult to tell exactly what is wrong with your coil without inspecting it; properly constructed, however, one of that size should give a very severe shock. From ¾ to 1 inch per mile of secondary wire is a fair average for ordinary coils, but this varies with the manner of winding and the degree of insulation. 3. My condenser is made of tissue tinfoil and paper of a thickness of 400 leaves to the inch; it is made like an interleaved book. It contains 45 square feet, and is well connected with the primary coil: but I get no additional effect. What is wrong? A. Your condenser is properly made, and should add materially to the effect if rightly connected to the primary circuit. Sprague's book, above referred to, gives much useful information in regard to the construction of coils.

(26) L. W. asks: Which is the best book on qualitative analysis? A. Fresenius is a standard work on the subject.

(27) F. B. asks: How can I make a silver bath, for electro-plating? A. Dissolve 123 ozs. cyanide of potassium in 100 gallons of water; get one or two flat porous vessels, and place them in this solution to within half an inch of the mouth, and fill them to the same hight with the solution; in these porous vessels place small plates or sheets of iron or copper, and connect them with the zinc terminal of a battery; in the large solution place a sheet of silver connected with the copper terminal of the battery. This arrangement being made at night, and the power employed being two of Bunsen's batteries or four Daniell's, the solution will be ready for use in the morning. A small quantity of solution for silvering may be made up from this description. A half ounce of silver to the gallon will do very well. A small quantity may be prepared in an hour.

(28) A. A. H. asks: 1. How can I plate silver without a battery? A. For silver plating on copper, use nitrate of silver and common salt, each 20 grains; cream of tartar, 3½ drachms. Mix. Moisten with cold water and rub on the article to be plated. 2. Can I make a solution by cutting silver in acid? A. Silver dissolves in dilute nitric acid.

(29) N. S. W. asks: I. What is the office of the core of wires in an induction coil, as shown in p. 115, vol. 33? A. The object of the core of iron wires is to increase the inductive effect. 2. Where is the connection with the conductors? A. The primary wires are attached to the binding screws at the right of the instrument. 3. What is the necessity of insulated wire if the coil is divided by insulators? A. The wire must be insulated, otherwise the current would leap across from one turn to another. If you will read the article carefully, you will see the object of the secondary coil. 4. If a battery current is connected with the coil, what is the necessity of the current breaker? A. It is by alternately breaking and making contact with the battery that the secondary effects are produced. A constant current through the primary coil would produce no static effect upon the secondary. 5. If the copper wire be immersed in a solution of shellac, is that insulation sufficient for a coil? A. A shellac covering might answer, but silk would be better.

(30) F. C. says: How can I deodorize a swordfish's sword? A. Try washing it with a little benzole or carbolic acid.

(31) L. P. S. says: In your issue of August 28 (in answer to M. V. O., who asks: Does a fan blower require more power to drive it when the discharge pipe is open than when it is closed?) You answer: "The action is the same as in partially closing the discharge valve of a pump. If the same speed is maintained, the resistance is increased." This is contrary to experimental results. If M. V. O. will make his fan belt sufficiently slack to reduce the speed of his fan one quarter or one third, by slipping, when the valve is open, he will find, on shutting the value, the fan will immediately resume its full speed. This, I think, is due to the changing of the course of the air as it rushes through the fan, from a straightforward to a rotary motion, which takes considerable power; but when no air passes through the fan, that which is inclosed within it, after having received its initial momentum, keeps it up without any additional power except to overcome the friction on the inside of the air jacket. I have often tried this, and always found it to take more power when the blast is taken from the fan. A. We think you are quite right, when the gate is entirely closed. As to the effect when partially closed, we would like to hear from readers who have made experiments. We are glad you have called attention to the matter, for we always desire to give correct information, and in our answer to M. V. O. we had in mind the action of blowers producing positive blast.

(32) K. asks: Is there a more speedy method of reducing a leaf to its skeleton (without destroying the fiber) than by steeping in pure water for months: a method, by the way, tried by me without success? A. Steep the leaf in a little strong lime water for a short time; spraying the leaf with water will then remove all but the fibers.

(33) J. G. E. asks: Is there any way of making cloth impervious to dust? A. Cloths that have been rendered impervious to moisture are likewise impervious to dust. Pass the cloth through a weak solution of glue and alum; and after passing it between the rollers of an ordinary wringer to remove the superfluous moisture, dry it, first in the air and then in a warm room.

(34) V. L. C. asks: How can I make plaster casts for stereotyping, so that they will not crack when put into heated metal? A. After the plaster cast has hardened, it should be placed in a hot oven in order to drive off all the superfluous moisture. Plates prepared in this way do not crack.

(35) G. C. says: 1. My counter is badly corroded by the action of soda water, and fountains have to be tinned every 3 years. Is there any remedy for this common annoyance? A. You fail to state of what material your counter is composed. If of wood or marble, we would suggest the use of a glass plate. Porcelain or slate topped counters are best where there is a liability of their frequent contact with carbonic acid water. 2. Would a small quantity of soda put in the water before charging prevent the mischief? A. No.

(36) Z. asks: Please explain the electric action in the automatic railway signal in use upon the Boston and Albany Railways. A. The action is produced by the opening and closing of an electric circuit by the movements of the cars upon the rails, and causes the movement of an armature attached to an electromagnet, which strikes a bell.

(37) F. M. W. asks: What is the process for clarifying and purifying lard, grease, and tallow? A. They are subjected to the action of steam at a high pressure in large cylindrical iron vessels. The steam is made to enter the vessel from below in such a manner as to cause a constant agitation of the melted contents. The condensed steam, being heavier than the grease, falls to the bottom of the cylinder, carrying with it the greater part of the impurities, and is drawn off by suitable taps.

(38) W. H. B. says: In your last issue you recommend a correspondent to use iodine in olive oil to prevent the hair from falling out. Will it not discolor the hair and skin? A. Yes; but almost inappreciably, and for a short time only. The color is not permanent.

(39) J. T. asks: Is any portion of the human tooth ivory? A. No.

(40) G. W. S. asks: 1. What is soluble or water glass? A. Water glass is a variety of glass containing a large proportion of alkaline flux. It is quite soluble in boiling water. 2. Would it answer for making a smooth hard finish on wooden handles, and give a polished surface? A. Water glass might answer the purpose; but it is an efflorescent substance, and would finally become converted into a white powder, if exposed to the air.

What is put in glue size to give it body? A. A little flour and litharge are sometimes used.

(41) C. A. B. asks: What can soft sandstone be saturated with to make it impervious (or nearly so) to water? Coal tar would do but for the color. A. A solution of alum, glue, and litharge has been used for this purpose.

(42) S. A. T. asks: What will prevent the beard from splitting, so that it will grow long? A. Clip the ends frequently.

What makes Limburger cheese have such a very strong and offensive odor? A. It's putrescence.

(43) L. I. asks: Please give me an analysis of crude petroleum. A. Crude petroleum varies in density from 0·820 to 0·782, or 40° Baumé to 48° Baumé. It is a mixture of a great number of hydrocarbons, compounds of carbon and hydrogen, the average proportion of the two elements being: Carbon 85, hydrogen 15. These hydrocarbons differ from each other in volatility. Some are so volatile as to evaporate rapidly at ordinary temperatures, others require a temperature of 700° to 800° Fah. to vaporize them.

(44) G. B. asks: What is a good alloy, resembling silver in weight and appearance? A. Try the following: Tin 4½ lbs., bismuth, antimony, and lead, each ½ lb.

(45) C. H. S. asks: How can I cover twine thread, etc., with metallic lead, so that on bending it will keep its shape? A. The process employed in manufacturing long lengths of lead pipe might advantageously be used for this purpose. In this the lead, in a molten condition, is forced by hydraulic pressure through a die, through the center of which a steel mandril, of the required size for the bore, passes. By a little alteration of the mechanism you might substitute twine or thread for the mandril, and decrease the size of the die.

(46) F. C. W. says: G. G. F. can remove glossy spots in black goods by rubbing them with a piece of cloth.

(47) M. W. W. says, in reply to numerous queries as to the size of axle spindles; The almost universal testimony is in favor, within certain ranges, of the large spindles, especially in common freight and farm wagons. This may not arise from the difference in the spindles, and probably does not, but from other causes. In practice, the small sized spindles are usually solid iron, and the spindles are turned, and the boxes bored to fit. The larger spindle is about twice the diameter for the same grade of wagon, that is, a 1½ inch solid iron spindle corresponds to a 3 inch thimble skein, as it is termed, which is usually a cast iron thimble fitted on to a wooden axle, not turned and with the boxes not turned, the fit being much looser than in the case of the solid iron spindle. This may have some effect, but I think the real cause is the greater stability of the wooden axle, retaining its set without springing, generally as long as it lasts; while it is probably rare to find solid iron axles that are not more or less sprung, when of course they run hard. This seems still more reasonable when it is considered that solid iron spindles (when the load is carried on springs, thus reducing the liability to spring the axle) seldom give any trouble. There is also some difference in weight in favor of the wooden axle, though hardly enough to justify the decided preference manifested for it.

(48) E. D. R. says, in answer to J. A. B., who asks if there is a seed called bird pepper: The pods thus called are the capsules and seeds of *capsicum annuum*, or cayenne pepper, and can be procured in almost any drug store under the name of bird pepper; mocking birds are extremely fond of them when fresh, and eat of them freely, hence the vulgar name. The best are the African bird peppers, and are the same as used for making pepper sauce.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

D. D. W.—No gold or silver is present. There is a trace of arsenic. The specimen is shale inclosing a yellow powder consisting principally of silica, iron, lime, alumina, and potash.—M. C. S.—It is smoky quartz, of little or no value.—C. C. P.—It is marcasite.—W. W. J.—It is a variety of soft white clay.—A. J. H.—Your specimens have not been received. Forward other specimens, and we will examine them.—R. L.'s specimen has not been received.—No name.—A fine specimen of variegated red jasper or shale.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On Squaring the Circle. By E. C.
On Rapid Transit. By J. H. McH.
On the Extraction of Gold from Ores. By J. T.
On the Weather. By W. B.

Also inquiries and answers from the following:

A. A. A.—L. H. D.—W. M. R.—J. D. D.—J. J. M.—R. K.—A. G.—F. J. S.—G. B.—G. W.—F. K.—C. D.—F. D. C.—W. M. T.—A. T.—R. B.—E. B. B.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells an efficient rice-hulling machine? Whose is the best firebrick press? Whose is the best dog power, for churning and other light work? Whose is the best rack press for expressing seed oil?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

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DESIGNS PATENTED.

8,588.—INKSTAND.—B. Brower, New York city.
8,584.—SILK FABRIC.—J. Coignet, New York city.
8,585.—GLASS DISH.—G. E. Hatch, East Cambridge, Ms.
8,586 to 8,589.—CARPETS.—A. Heald, Philadelphia, Pa.
8,590.—CARPET.—W. Kerr, Philadelphia, Pa.
8,591.—BADGE.—J. S. Littell, Newark, N. J.
8,592.—CASSIMERES.—W. B. Weeden, Providence, R. I.
8,593.—FLAG.—J. C. Deming, Norfold, Va.

SCHEDULE OF PATENT FEES.

On each Caveat.....$1.
On each Trade mark.....$2.
On filing each application for a Patent (17 years).....$15
On issuing each original Patent.....$20
On appeal to Examiners-in-Chief.....$10
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On filing a Disclaimer.....$10
On an application for Design (3½ years).....$10
On application for Design (7 years).....$15
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CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA September 4 to 7, 1875.

5,123.—H. S. Pomeroy, New Haven, Conn., U. S. Automatic lid drop. Sept. 4, 1875.
5,124.—W. E. Andrew, New York city, U. S. Separating oleomargarin and stearin from fat. Sept. 4, 1875.
5,125.—A. W. Richards. Indianola, Iowa, U. S. Perambulating cot. Sept. 4, 1875.
5,126.—G. Campbell *et al.*, Toronto, Ont. Fireproof shutter. Sept. 4, 1875.
5,127.—A. Weir, Wellesley, Ont. Spinning wheel. Sept 4, 1875.
5,128.—G. S. Walker, Erie, Pa., U. S. Washing machine. Sept. 4. 1875.
5,129.—W. Ball, New Vienna, Ohio, U. S. Canal boat. Sept 4, 1875.
5,130.—J. H. Myers, Montreal, P. Q. Shirt. Sept. 4, 1875.
5,131.—J. Buechner, St. Paul, Minn., U. S. Picture exhibitor. Sept. 4, 1875.
5,132.—J. W. H. Doubler, Philadelphia, Pa., U. S. Mechanical motor. Sept. 4, 1874.
5,133.—O. Noack, Baltimore, Md., U. S. Crimping machine. Sept. 4, 1875.
5,134.—G. J. Shimer, Milton, Pa., U. S. Cutter head. Sept. 4, 1875.
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