Notes & Queries

J. K. asks: How can I obtain a varnish or other liquid, that would be perfectly oil proof, and not crack when spread on a flexible surface? Soluble glass will not do.

G. W. B. asks: What is the best preparation for dyeing felt to a glossy black?

L. W. asks: How can brass be made of a permanent dark brown color without the use of paint?

G. W. C. asks: If two locomotives were placed at the summit of an incline and allowed to descend of their own gravity (all things being equal except the size of wheels, which are four feet diameter on one and six feet diameter on the other), which will reach the foot of the hill first? If either, why? [This is a good problem for some of our younger readers, and we would be glad to hear from them on the matter.—EDS.]

H. M. H. asks: How can I prepare test lead for assayer's use? I want to get it free from silver, copper, etc., and to have it as nearly pure as possible.

C. E. R. asks: How can I make ink which, if used on blue writing paper, will take the color out, leaving a clear white letter?

Answers to Correspondents

C. C. says: I wish to make a small speculum for a reflecting telescope. 1. Can I electroplate the surface of my mold with speculum metal? 2. If so, how can I polish the surface of my mirror? 3. Is there any way to determine the dip of the speculum that will be necessary to overcome all aberration? Answers: 1 and 2. Speculum metal, being an alloy of copper and tin, you cannot plate with it; but you can of course plate the surface of your mold with silver, which, when polished, gives an excellent reflecting surface. Polish with chamois leather and Paris white. 3. A parabolic form given to the mirror of a speculum will prevent aberration.

C. A. C. asks: 1. How can I bleach or whiten sponge? 2. How can I make a silver-coating solution? Answers: 1. Sponge can be bleached by first soaking it in very dilute hydrochloric (muriatic) acid to remove calcareous matter, and then in cold water, changing it frequently and squeezing the sponge out each time to remove all traces of the acid. It is next soaked in water holding a little sulphurous acid, or (better) a very little chlorine in solution. The sponge afterwards is repeatedly washed and soaked in clean water, scented with rose or orange flower water and dried. 2. You can silver brightly polished articles of copper or brass by using the following mixture: Silver dust (fine) 20 grains, alum 30 grains, common salt 1 dram, cream of tartar 3 drams; rub them together to a fine powder, make into a paste with water and rub on the surface of the copper or brass. The silver powder is made by precipitating it from a solution of nitrate of silver by means of a copper plate.

W. H. W. M. asks: What vegetable or mineral substance does the grape vine absorb from the earth in order to color the grape skins purple? Is the change due to the action of the sun? If so, what transformation does the grape go through? 2. What is the best and cheapest manner of preparing skeleton leaves for ornaments? 3 How can I remove ink from a Brussels carpet? Oxalic acid appeared to take it all out; but when the carpet dried, the dark color of the ink returned. Answer: 1. The change of color from the green unripe fruit to the purple grape is due to a molecular change, caused by the chemical action of light, or the natural organic changes in the fruit, on coming to maturity. A molecular change does not indicate any chemical change in composition. The influence of heat in effecting this change may be seen in the case of ordinary yellow and red phosphorus. Heat has effected a molecular change without altering the chemical composition. 2. Collect dry leaves and boil them for an hour or more in the following mixture: Dissolve 4 ozs. washing soda in 1 quart hot water, and add 2 ozs. quicklime; boil together 15 minutes, and pour off the clear portion after settling. Boil the leaves in this solution until the fleshy matter of the leaves is soft. Put the leaves then into cold water, and rub the soft portion away. Then place them for about 15 minutes in a solution of bleaching powder (chloride of lime) with a little vinegar. Lastly wash in cold water and dry. 3. Damp the spot with boiling water and rub quickly into it some finely powdered oxalic acid. Repeat if necessary.

L. H. W. asks: What will be the difference between the power of a steam cylinder three inches in diameter with six inches stroke of the ordinary construction, making two hundred revolutions per minute, and that of a rotary steam engine with the same amount of steam surface on the periphery of a seven inch drum, making four hundred revolutions per minute? Will the same proportion hold good in all sizes of engines? Answer: You can readily calculate this for yourself in any case. The power exerted by the reciprocating engine = area of piston in square inches × twice length of stroke × number of revolutions per minute × steam pressure ÷ 33,000. The power of the rotary engine = area of piston in square inches × mean circumference of revolution × number of revolutions per minute × steam pressure ÷ 33,000.

J. N. N. says: When a common house fly dies upon a mirror or pane of glass, it is found surrounded by a kind of opaque vapor, or substance resembling vapor, for about a sixteenth of an inch in all directions. Can you tell me the cause? Answer: It is a mold or fungus that springs from the decaying body of the fly.

W. C. C. asks: Why do railroad men continually grumble about cast iron wheels, and yet cannot be prevailed upon to use any other? Answer: Chilled cast iron wheels are considered by many railroad men to be the best. The principal objection to wrought iron and steel wheels is the cost.

D. asks: If a patent is granted for an article of product in the United States, can a party put up the same article in Canada, and export it across the water or ship it into the United States for sale on paying duty? Answer: In this country no person has the right to sell, use, or make a patented article without the consent of the patentee.

E. W. C. asks: 1. What is the greatest horse power obtainable by a turbine water wheel? 2. What is soluble glass, and how is it manufactured? 3. What is the analysis of salt? Answers: 1. The horse power capable of being exerted by a turbine wheel is limited only the hight of fall, quantity of water and size of wheel. 2. Soluble glass is a silicate of potash, or of soda, or a double silicate of both. It can be made by fusing together 1 part silica and 2 parts carbonate of potash or soda, or 54 parts dry carbonate of soda, 70 parts of dry carbonate of potash and 192 parts silica. 3. Common salt is chloride of sodium, a combination of the two elements chlorine and sodium. It contains, when pure, 60 of chlorine and 40 of sodium in 100 parts.

A. R. asks: Is it true that a locomotive engine, when towed for a short distance, would fill the boiler (by suction) full of air, taking the supply through the exhaust nozzles, making the boiler a compressed air receiver, and by this means store up power sufficient to propel the engine? The engine is supposed to be in full working order, with the cylinder cocks closed. The pressure (over a certain amount) would, I maintain, be relieved by the air escaping by the way it entered. Answer: Such an occurrence might take place under certain circumstances, depending upon the direction in which the engine was moving and the position of the link.

M. H. S. asks: What is used for bronzing small cast iron pieces, so that the bronzing does not corrode or wear off? Answer: The method most commonly employed is to use a bronze lacquer. Sometimes bronze powder is put on with sizing.

D. asks: What will destroy cutch brown on silk or wool, and not injure the goods, so that a good black can be dyed on it? Answer: Wash the goods thoroughly and expose them in a close chamber to the fumes of burning sulphur, or plunge into water moderately impregnated with sulphurous acid gas. Afterwards wash thoroughly and dry.

D. J. J. says: 1. I have a blue flannel shirt with a white flannel bosom; the latter cannot be taken off, and I would like to know how to clean the white flannel without injuring the blue flannel. Will ammonia or ether do it? What will clean the blue flannel without injuring it? Answer: Wash your flannel in the ordinary manner, but immerse at once in warm water, not in cold, and let the operation of washing be done as quickly as possible. This will prevent, in some cases, the removal of the coloring matter, and also shrinkage.

G. H. asks: 1. Is there any chemical compound which will give to dark hair a permanent, natural gray color? In other words, can you destroy the vitality of the hair without injuring its growth? 2. What is the nature of the dye that some ladies use to give their hair the appearance of age? 3. Is this dye permanent? 4. Has it ever been demonstrated that explosions of boilers, not manifestly due to low water, are caused by generation of electricity or by some power greater than steam, inside of the boiler? If not, what is the accepted theory on this point? Answers: 1. We think not. 2, 3. They employ a powder. 4. Our theory of boiler explosions is that they occur because the pressure of the steam is greater than the boiler can sustain.

S. T. W. asks: What is the American standard for a horsepower, and what difference is there between the American and the English standards? Answer: The English and American units for horse power are the same, namely, the work performed in raising 33,000 lbs. one foot high in a minute.

S. P. asks: If a rope has a horse hitched to each end, the horses pulling in opposite directions with a force of 500 lbs. each, what is the strain on the rope? Answer: 500 lbs.

J. S. asks: What ingredients are used to render neutral to each other two or any number of different colors of oil paint, so as to keep them from running together on water or while wet, and the process of mixing the paints with such substances? Answer: If you have in view the finishing of water colors with oil paints, a method to prevent the different colors running together is to cover the water color, when perfectly dry, with a thin coat of size, carefully applied.

J. G. D. T. asks: Does corned gunpowder, when ignited, expand gradually until it breaks its enclosure, or does it create an explosion without any gradual expansion? Answer: Expansion is necessary to explosion. In the case of gunpowder, it takes place quickly.

S. B. L. asks: How can I temper small tools? Answer: You should heat the articles to a straw color, and plunge them into water which has the chill taken off. You may be able to produce a better temper by dissolving some soap in the water. To heat to a straw color, place the articles in a pot of melted tallow, over a fire. When the tallow is heated to such a degree that it just commences to smoke, withdraw the articles, and plunge them into the water.

W. M. asks: What will take the stains of pears and apples out of linen and cotton? Answer: Wash the articles thoroughly in hot soap and water, and then apply, with a rag or sponge, a little *aqua ammonia*, commonly called spirit of hartshorn.

C. N. asks: Does not the use of a bucket pump, instead of a double acting one, involve the loss of over ½ of the power that would be available by the use of the latter? Suppose that the head be 102 feet, which gives a pressure of 45 lbs.; to this head add 10 feet, as the pump is set in the water, which will add about 4 lbs. to the lift on the bucket, the diameter of the bucket being 57 inches: 57 inches diameter = 2551·7646, which × 49 lbs. pressure gives a load on the bucket of 1.7588·23 lbs. The diameter of the plunger (being 40 inches) gives an area of 1256·64, which × 45 gives a water load of 56548·8. Answer: The double acting pump ordinarily has a check valve at the bottom of the delivery pipe, so that the head of water in the pipe is not available in the down stroke. It would appear, then, that the only loss in the bucket pump, which is not also incident to the double acting one, arises from not utilizing the weight of the bucket and pump rod in the down stroke.

W. F. S. asks: 1. Is it safe to blow off at 60 or 70 lbs, the certificate allowing me to carry 80 lbs.? The boiler is 5 years old and in good condition. 2. I am greatly troubled about keeping packing in around valve rod and piston. The engine runs very hot. It makes 250 revolutions and the packing burns out very quickly. 3. Is it easier to keep up steam with a little over one gage of water, or is it better to have the boiler full, after it once raised to the required pressure? Answers: 1. If you are in doubt about your boiler, the best plan would be to test it. A convenient method was given in our answers to correspondents, a short time ago. 2. Try asbestos packing. 3. We do not believe there is much difference in either case.

W. W. J. asks: How can I temper malleable iron, or convert it into steel? Answer: We suppose you refer to the case-hardening of iron. Heat the iron to redness, cover it with prussiate of potash, and plunge it into cold water. A better process is to heat the iron in an airtight box, containing animal carbon, which may be prepared by slightly burning horns or hoofs, and reducing them to powder. Keep the box at a light red heat, for an hour or more, and then empty its contents into cold water. Either process hardens the iron on the surface, but does not convert the whole material into steel.

R. M. says: I have a steam engine, 14 inches cylinder and 20 inches stroke, making from 100 to 120 strokes per minute, running without governor. The valve has very small lead, scarcely one thirty-second of an inch. I want to know if more lead would not give me more power, and also let the engine run more easily? About twenty years ago I had an engine of 2 feet stroke, with but small lead; I had occasion to change the run of the engine; and in doing so, I happened to give her nearly ¼ inch lead, which made her run, I think, one fourth faster, with the same amount of steam. Answer: The proper amount of lead can best be determined by experiment, and you can probably hit upon it after a few trials.

J. says: In riding in the bed of a creek, I came across a spot that sounded hollow; no outlet could be seen; the bottom was sand and gravel, and the creek was moderately full only. What would be the result of digging? 2. Does it injure a shot gun to oil it inside? If oil is used, what kind is best? Answers: 1. If you should dig over the spot where the hollow sound was perceived, you would probably tap a cave, or natural hollow in the earth. Such are produced, especially in limestone districts, by water, which has dissolved or washed away the mineral substance which originally filled them. 2. If you use any oil for your gun, use some kind that will not oxidize or thicken, such as watchmakers' oil; and use very little of that.

F. X. M. says: Our men in the shop use soft soap to remove the grease and dirt from their hands when they quit work. This, they find, causes cracks to come; but if they dip them in vinegar just after washing with the soft soap, their hands will remain soft and smooth, and any cracks on the hands will immediately heal up. Can you give the chemistry of this? Answer: In the ordinary careless manufacture of soft soap, there is apt to be sometimes an excess of alkali or lye, above that necessary for complete saponification. This has a caustic action on the skin, making it rough, and otherwise injuring it. After using soap of this kind, washing in vinegar removes the excess of alkali from the hands. Vinegar, being an acid, combines with the alkali, forming a neutral and soluble salt.

D. F. asks: Will carbureted air burn in an atmosphere of its own carbonic acid, under a pressure of 60 lbs. to the inch? Answer: No.

S. R. asks: What can be done to make gasoline gas burn steadily when a draft of air or gust of wind strikes the flame? Coal gas is not affected by winds nearly as much as that of gasoline. Answer: The peculiarity you speak of is due to chemical causes which it is difficult to obviate. Coal gas or heavy carbureted hydrogen is a complete chemical compound with little or no mechanical mixture of incombustible substances. Its combustion, therefore, gives rise to a steady flame, the light being produced by incandescent particles of carbon, and a complete chemical decomposition of the hydrocarbon taking place. In carbureted air, however, made by passing atmospheric air through naphtha, etc., we have merely a mechanical mixture of a hydrocarbon vapor with an incombustible gas, namely, the atmosphere. The nitrogen, by far the larger portion of the air, not being combustible, is rapidly driven off through the flame, giving rise to the flickering unstable flame of carbureted air.

M. asks: What should be the form and size of the fire box for a vertical boiler (without flues) 3 feet by 1½ feet, made of No. 14 iron; and what pressure will such a boiler safely bear? Answer: The boiler should have a flue all around it, extending nearly up to the top (the smoke pipe connecting at one side), and the grate should be as large as the diameter of the flue. The boiler will sustain with safety a pressure of about 35 pounds per square inch, if, as we suppose, its diameter is 18 inches.

E. E. H. asks for an explanation of our recipe for preserving cider. Answer: Read ½ pail of sugar instead of ½ part. We have since learned from the manufacturer that the sugar may be omitted, with advantage, when the juice is good. The sugar is apt to cause too great a fermentation. If sugar be added, however, experience would teach what quantity to use.

J. R. asks: When an electric battery is applied to a person for some time, and he keeps shaking afterwards as if he still had hold of the handles, is it right to apply the battery to take it off him again, or to let the electricity remain in till it goes of itself? Answer: Any trembling or shaking of the muscles or limbs after an electric shock is a sign that the shock has affected the nerves too severely, and not that any free electricity still continues to circulate in the body. Another application of the battery would only make matters worse.

J. T. asks: How is it that steam taken from a boiler will force water into same boiler, that is, force it against itself? Answer: In the action of the Giffard injector, steam is condensed, and the power previously existing in it is expended in the propulsion of the water.

G. W. asks: 1. What is Javelle water? 2. What is the easiest and most economical way of procuring oxygen gas? 3. How is soda water made? 4. Where can I get Bloxam's "Chemistry?" Answer: 1. See, p. 278 vol. 26. 2. Heat the binoxide of manganese to a dull red heat in an iron retort. 1 lb. of good commercial binoxide of manganese will yield from 5 to 6 gallons of oxygen. 3. By charging water under pressure with carbonic acid gas, procured by the action of sulphuric acid on marble dust or any carbonate. 4. See our advertising columns for publishers.

C. A. D. asks: When, where, and by whom were spectacles invented, and what first suggested their use? Answer: Spectacles were first invented in the thirteenth century. Francisco Redi, in a treatise on spectacles, says that they were invented between the years 1280 and 1311 A. D., by a monk of Florence named Alexander de Spina. Muschenbroeck says that it is inscribed on the tomb of Salvinus Armatus, a nobleman of Florence, who died in 1317, that he was the inventor of spectacles. By others Roger Bacon, in England, who died in 1292, has been considered the inventor.

T. B. W. asks: If a steam boat runs eight miles in an hour, from point to point (in still water), what distance would she run with the help of a four mile current? Answer: The speed of the vessel would be increased by the speed of the current, if the resistance of the air is neglected.

J. S H. P. asks: 1. How is carbolic soap made? What proportion of the (pure) acid is used? 2. In midwinter, when the thermometer in the room stands at 80° or 85°, though clad in thick under and outer garments, we call it only comfortably warm. But in summer at the same temperature, though clad in the thinnest possible garments, we loll in the shade and call it intolerably hot. Why is this? Answers: 1. Carbolic acid soap is made by adding from 5 to 20 per cent of carbolic acid, according to the use to which it is to be applied. 2. We do not always feel the same degree of temperature, for example, 85° Fah., to be invariably oppressive or hot. This is owing to the fact that the atmosphere at this temperature sometimes contains more moisture than at others. The drier the warm or hot atmosphere, the less the heat is felt, owing to the rapid evaporation of perspiration from the surface of the body. During a cold clear winter's day the air contains much less moisture than in summer, so that, although we may be in a room artificially heated to 80° Fah. or above, it may not feel uncomfortable, the insensible perspiration rapidly passing off and cooling the body.

C. W. E. asks: How can I make an electro-magnet to be operated by an earth battery? Answer: You can make an earth battery by sinking two large plates of copper and zinc in moist earth, and connecting them by conducting insulated wires attached to each. Such a battery was constructed by Bain in 1841. You can make an electro-magnet by winding stout copper wire, covered with silk, around a piece of soft iron bent in the form of a horse shoe, care being taken that the coils are wound in the same direction around each bobbin, either from or towards the axis of the magnet. The more numerous the coils, and the greater the power of the electric current, the stronger the magnet.

W. S. B. asks: How can I anneal gold after it has been cast? Answer: We think you can do it by heating the gold, and allowing it to cool slowly.

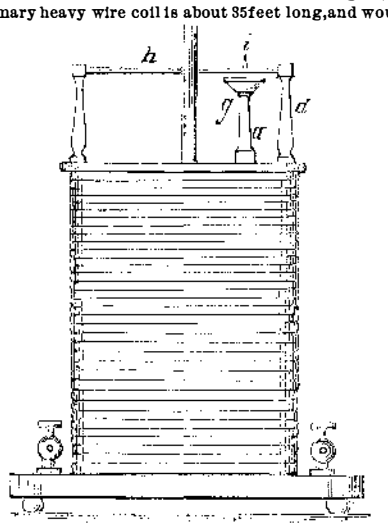
C. R. asks: 1. What is the best and most economical constant battery? 2. I have heard of a thermo-electric battery. Is there one of practical utility? Answers: 1. Daniell's battery is recommended for constant action. It is not expensive, and no gases escape from it. It consists of a cylinder of copper, in which is placed a cylindrical vessel made of unglazed biscuit ware, or porous earthenware. Into this porous vessel a rod of amalgamated zinc is placed. The copper vessel is filled with a saturated solution of sulphate of copper with a little sulphuric acid. The porous cell is filled with dilute sulphuric acid, and on a perforated shelf, fixed to the upper part of the copper cylinder, are placed crystals of sulphate of copper (blue vitriol) to keep up the strength of the solution. 2. Thermo-electric batteries have been made of considerable power, but we know of none that have ever come into practical use.

D. H. M. asks: How can I separate iron from copper and brass? Answer: If you heat the metals in a crucible, the brass will be melted first, and can be poured off.

S. asks: 1. How is aniline made from coal tar? What apparatus is necessary? 2. How are bronze powders made? 3. How are the various colors produced from aniline? 4. Can you give me a good recipe for Worcestershire sauce? Answers: 1 and 3. The basic portion of coal tar or coal tar naphtha, that is, the least volatile products of the distillation of these substances, is strongly agitated with hydrochloric acid in excess. This is done on the large scale in vessels lined with lead. The clear portion of the liquid is then decanted and evaporated until acid fumes appear. It is again filtered and neutralized with potash or milk of lime and distilled. The portion that passes over at 360° Fah. is crude aniline. By the action of bichromate of potash on sulphate of aniline, rich shades of purple and violet are produced. 2. To make a bronze powder, mix peroxide of tin and sulphur, of each 2 parts, sal ammoniac 1 part. Expose to a low red heat in an earthenware retort until sulphurous fumes cease to be given off. 4. The following recipe gives a fine sauce: Port wine and mushroom ketchup, of each 1 quart; walnut pickle 1 pint; soy ½ pint; pounded anchovies ½ lb.; fresh lemon peel, minced shallots and scraped horseradish of each 2 ozs.; allspice and black pepper (bruised) of each 1 oz.; cayenne pepper and bruised celery seed of each ¼ oz. (or curry powder ½ oz.); digest for 14 days, strain and bottle.

W. W. B. says: In making gas from petroleum, there are several difficulties of which the most serious is the deposit of carbon in the shape of dry powder in the retorts, and other troubles between the retort and the gas holder. Petroleum is the finest gas-making material we have, taking into consideration its price; it will yield from 6,000 to 8,000 feet per barrel, and the supply seems to be inexhaustible. It is a question of great importance to the oil producer to get a steady market for his oil, and to the people to get a cheap and good light. Both of these objects would be attained by a practical solution of this question: Can gas of good quality, and cheap, be manufactured from crude petroleum on a large scale? I say that it can, and it can be done by any mechanical arrangement to inject air and petroleum in graduated quantities into the retorts; and I also say that it will convert all the petroleum into gas of high illuminating quality and leave no carbon in any shape, either in retort or pipes. I have proposed the question to many gas men, but nobody seems to know anything about it, except that petroleum is a difficult thing to handle in gas making. I write to you to ask: 1. Will not the injection of air and petroleum into the retort convert all the petroleum into gas? 2. Would there be any deposit of carbon on the retorts or pipes? 3. Would it be a permanent gas or a mechanical mixture? 4. Would there be danger of explosion from injecting a graduated quantity of air into the retort? Answer: Petroleum being a mixture of various hydrocarbons, that is, various chemical combinations of hydrogen and carbon that are for the most part liquid at ordinary temperatures, it is obvious that it cannot be changed into a permanent gas without decomposition, or a new interchange of its elements, forming new chemical compounds. It is found that, when petroleum is submitted to a high temperature without access of oxygen, decomposition takes place, a quantity of uncombined carbon being deposited. It is evident, then, that the permanent gas formed is a hydrocarbon with a less proportion of carbon than the liquid petroleum. To convert all the petroleum submitted to heat into a gaseous body, something must be supplied that will combine with the extra carbon and form either another illuminating compound or one that can be removed by subsequent purification. When petroleum burns in the air, its elements combine with oxygen, forming carbonic acid gas and vapor of water. The injection of air or oxygen into the decomposing retorts would therefore defeat the object in view that of making a permanent illuminating gas. It would simply cause a combustion of the petroleum more rapid than that which takes place in the open air, besides the risk of explosion. It would be far more philosophical to inject hydrogen with the petroleum into the retort, or to decompose the petroleum in an atmosphere of hydrogen. This hydrogen could be readily formed by decomposing superheated steam by means of red hot anthracite coal. Indeed, superheated steam alone in contact with the decomposing petroleum might yield a portion of its oxygen to the extra carbon, thus obviating its deposition on the retort, forming carbonic acid gas which could be removed by water. If free hydrogen were liberated, it would increase the heating properties of the flame. We simply mean here to indicate the philosophical method of experiment, bearing in mind the constitution and affinities of chemical bodies. Nothing but practical trial in this way can solve the problem of the utilization of petroleum in the manufacture of illuminating gas.

J. M. asks: How can I make an induction coil to use with two large Grove's cups? With this arrangement, can I make an electric light? Answer: You can make an induction coil as follows: In the figure, the primary heavy wire coil is about 35 feet long, and wound



round a glass tube. Outside of this is wound the secondary fine wire coil of about 1,400 feet. Battery contact is broken and renewed by the rotation of a soft iron bar, *h*, which, mounted between two brass pillars, is placed immediately over the axis of the coil, in which is placed a bundle of soft iron wire. The current of the battery passes through the pillar *d* and the axis carrying the iron bar, and contact is broken and renewed by the point *i* dipping as *h* revolves into and out of mercury in the brass cup *g*, on the pillar *a*, through which the circuit is completed. The binding screws in front connect with the ends of the coarse interior coil, and for connection with the battery. Two screws behind connect with the ends of the fine wire coil, from which the secondary current is derived, and from which shocks may be taken, water decomposed, etc. You cannot make the electric light with this arrangement. That requires that the fine wire coil should be wound round a soft iron horseshoe magnet, which is made to revolve rapidly in front of a permanent or temporary electromagnet.

J. K. asks: Is there in existence a means or contrivance to start, and keep in motion for one minute only, a machine which uses 5 horse power? The power which runs the machine is unable to set it in motion, and cannot even assist in it. What may I employ to start the machine? Answer: We hardly get your idea; but as the question is stated, it would seem possible to apply some other power, say that of a steam engine, to start the machine.

A. L. B. says: In your answer to I. E. E., the method by which the Lexington Avenue Synagogue is lighted by electricity is incorrectly stated. The burners in the Synagogue are not lighted by the galvanic current heating a platinum wire, but by induced electricity, produced by a new frictional apparatus and condenser, contained in one small case. The electricity, generated by turning a crank, is stored up in the condenser, which, when a sufficient quantity and intensity is arrived at (depending upon the number of burners to be lighted), is discharged, producing a spark at each burner—the circuit being there broken—and ignites the gas which has been turned on immediately before the discharge.

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

J. E. H.—Siliceous earth, apparently infusorial. Infusorial earth is used as a polishing material, under the name of electro-silicon.

J. R. E.—Blue clay, a silicate of alumina.

P. S.—Hypersthene (or Labrador hornblende) with iron.

W. W. B.—Galena (sulphide of lead).

T. F. H.—Galena (sulphide of lead).

J. W. C.—Micaceous iron ore.

COMMUNICATIONS RECEIVED.

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

On Crucibles. By L. T. C.
On Silicon Steel. By C. W. H.
On Heat. By H. C. F.
On Perfect Combustion. By C. R.
On a White Blackbird. By J. S. B.
On Using Heat Twice. J. A. H. E.
On Transit on the Canals. By R. D. R.
On the Art of Inventing. By K.
On Lunar Acceleration. By J. H.

Also enquiries from the following:

C. K. C.—P. W.—W. H.—W. H. S.—E. J.—E. H. K.—S. E. J.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL.]

Index of Inventions

FOR WHICH

Letters Patent of the United States

WERE GRANTED FOR THE WEEK ENDING

October 14, 1873,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

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Can, oil, W. A. Foster 143,567
Can for oils, etc., J. G. Evenden (r) 5,598
Can, sheet metal, J. G. Evenden (r) 5,599
Cans, forming seamless, M. Von Culin 143,735
Cans, etc., filling, C. S. Bucklin 143,613
Candy cutter, F. Quinn 143,590
Car axle box, L. Schulze 143,592
Car coupling, G. Edmonds 143,680
Car coupling, J. H. Payne 143,686
Car coupling, W. D. Pope 143,688
Car coupling, G. W. Putnam 143,716
Car coupling, E. R. Scott 143,720
Car coupling, J. Seislove 143,593
Car coupling, E. D. Smith 143,728
Car coupling, O. Taylor 143,646
Car wheel, A. F. Cooper 143,560
Carriage, child's, L. Havasy 143,624
Carriage, child's, J. G. Kamphaus 143,628
Carriage shaft holder, A. C. Maxfield 143,582
Carriage spring, G. Hopson 143,576
Carriage top joint, J. H. Combs 143,669
Chair folding, D. N. Selleg 143,721
Churn, J. L. & T. R. Britt 143,612
Churn dasher, I. B. Compton 143,559
Clock calendar, A. Frankfeld 143,618
Cock, J. W. Faxon 143,683
Copy holder, W. R. Carter 143,616
Corn husker, G. W. Carr 143,667
Cracker machine, J. Fox 143,686
Cracker machine, G. J. Kingsbury 143,579
Cultivator, C. M. & D. E. Hall (r) 5,601
Cultivator, wheel, Matchet & Smith 143,631
Cutter head, H. Fletcher 143,565
Cutter and planter, potato, L. J. Mewborn 143,707
Dice box, J. Twamly 143,599
Distilling pure alcoholic spirits, C. Andersen 143,654
Domino, B. Louineau 143,702
Door hanger, S. L. Bignall 153,557
Electric signaling, R. K. Boyle 143,663
Electric railway signal, S. C. Hendrickson 143,694
Engine governor, steam, C. R. Rungvist 143,642
Engine, rotary steam, Shaw & Baker 143,723
Equalizer, draft, W. W. Hinman 143,696
Fare box, T. L. Johnson 143,698
Fence, picket, R. H. McGinty 143,632
Fire arm, revolving, Forehand & Wadsworth 143,566
Fire escape, C. Dietrich 143,677
Fire extinguisher, portable, I. C. Andrews 143,605
Forceps for snouting hogs, G. Stephenson 143,730
Fumigator for hospital use, T. J. Mayall 143,583
Furnace, chimney, L. White 143,739
Gage, cloth marking, E. E. Emery 143,681
Gage, registering steam, P. Maltby 143,630
Gas retort, T. Davison 143,675
Glass ware, mold for, G. H. Lomax 143,629
Globe holder, C. H. Barney 143,656
Gun, breech loading, etc., B. & W. G. Burton 143,614
Gun, machine, C. Stensland 143,729
Harness attachment, hitching, T. J. Dobbs 143,678
Harrow tooth, W. H. Platt 143,713
Harvester, T. N. Foster (r) 5,606
Harvester, T. N. Foster (r) 5,607
Harvesting machine, Bayliss, Brown & Lamont 143,609
Heel burnishing machine, C. W. Glidden 143,690
Heel hand tool, S. L. Riker 143,718
Hinge, H. Manneck 143,704
Hoisting apparatus, N. S. McFarland 143,706
Hose, hydraulic, L. R. Blake 143,661
Indicator and safety valve, J. Smith 143,644
Iron and steel, E. Peckham 143,637
Iron from slag, J. J. Vinton 143,600
Latch for doors, locking, E. Halsey 143,692
Liquids, cooling coil for, W. Gee 143,689
Lubricator, J. McL. Power 143,639
Mail pouch holder and catcher, B. F. Bean 143,657
Malt dryer, W. W. Hughes (r) 5,602
Map exhibitor and cabinet, W. A. & G. Rice 143,717
Matter, composition of, G. T. J. Colburn (r) 5,596
Measure, tailor's, J. Beaudry 143,556
Metal working machine, H. B. Sevey 143,722
Mill, grinding, R. & S. Patterson 143,710
Mop holder, E. M. Naramore 143,633
Mortar mixer, Hoagland & Mickel 143,575
Needle and shuttle threader and knife, J. Slack 143,726
Nut device, divided, F. A Huntington 143,626
Ores, reducing, J. H. Boyd 143,662
Organs, pneumatic action for, T. Winans 143,602
Packing, piston, T. J. Mayall 143,705
Pan, amalgamating, I. S. Parke 143,635
Pan, evaporating, D. Watson 143,649
Paper bag machine, L. C. Crowell 143,674
Paper ruling striker, J. D. Connolly 143,672
Pavement, stone, T. D. Owens 143,587
Peat machine, Clayton & Howlett 143,611
Photographic embossing press, E. B. Barker 143,608
Photographic printing frame, W. H. Jacoby 143,577
Piano action, F. L. Trayser 143,647
Pinchers, shoemaker's, T. B. Shelly 143,594
Pipe for buildings, fire, H. Palmieri (r) 5,608
Pipe for water works, stand, G. W. Pearsons 143,711
Pipe machine, curved, R. Connable 143,670
Pipe, curved, R. Connable 143,671
Pitman, F. R. Glascock (r) 5,600
Pitmanrod, S. N. Wate, Jr. 143,648
Plane, splint, H. L. Weagant 143,737
Plowing machine, J. Utter 143,734
Plow, W. Blackstone 143,660
Plow, L. C. Frost 143,640
Plow, snow, Sweet & Noble 143,731
Power, transmitting, J. Rankin 143,640
Press, cotton and hay, D. Reynolds 143,641
Press, hay and cotton, J. Muller 143,586
Printing press feed gage, G. Wilcox 143,652
Pruning implement, A. P. Bettersworth 143,659
Pump for mines, portable, W. E. Sidney 143,724
Pump, steam and vacuum, A. J. Simmons 143,725
Railway rail, B. Myers 143,708
Railway signal, electric, S. C. Hendrickson 143,694
Rake, J. O. Jones 143,578
Rake, horse hay, W. H. Hartley 143,572
Rake, revolving horse, M. K. Flory 143,684
Refrigerator, W. M. Baker 143,607
Refrigerator, J. Rohrer 143,591
Refrigerator and cooler, C. D. Hicks 143,625
Register and indicator, E. P. Wheeler 143,651
Rein holder, J. W. Clark 143,668
Roof, fire and waterproof, J. Long 143,581
Roofing, composite, R. S. Jennings 143,697
Saddle tree, side, J. Straus, (r) 5,609
Sash holder, Anderson, Walden & More 143,655
Saw, jig, M. E. Weller 143,650
Saw set, M. E. True 143,598
Saw sharpening machine, E. W. Phelps 143,712
Scales, bag holder weighing, A. H. Bell 143,658
Screw cutting machine, M. B. Flynn 143,685
Sewing machine corder, J. G. Powell 143,589
Sewing machine table, W. H. Boyer 143,614
Sewing machine treadle, S. B. Bushfield, (r) 5,595
Sheet metal bending machine, C. F. Brand 143,558
Shovel handle, Pomeroy & Owen 143,714
Ship's sails, stay for, C. Freeman 143,568
Shutter fastening, J. A. Morris 143,585
Skins, removing dirt from, C. Turner 143,733
Soap, surface to hard, W. V. Wallace 143,601
Spark arrester, locomotive, M. Brassill 143,664
Spirits, distilling alcoholic, C. Andersen 143,654
Square, protractor, rule, etc., C. J. Shoff 143,595
Stirrup, N. C. Thompson 143,732
Stone, artificial, W. E. Ferslew 143,568
Stove, J. G. Widman, (r) 5,605
Stove, base burning, A. Hathaway 143,693
Sugar cane, preserving, W. Green 143,622
Tag fastener, J. M. Goodridge 143,621
Telegraph cable, T. Tommasi 143,597
Telegraph, printing, L. T. Lindsey 143,702
Telegraph circuit, L. T. Lindsey 143,700
Telegraph regulator, L. T. Lindsey 143,701
Thill coupling, J. C. Thompson 143,596
Thrashing machines, separator for, S. R. Perkins 143,588
Trap, animal, B. F. Smith 143,727
Uterine supporter, A. C. Byam 143,615
Waffle baker, S. S. Fitch 143,564
Wagon, dumping, Greer & Thomason 143,570
Wagon seat, I. Powers 143,715
Wash bench, A. G. Emery 143,562
Washer cutter, H. E. Whipple 143,738
Washing machine, Nixon & Babcock 143,709
Watch key, Allen & Hall 143,653
Watch, double stop, A. Frankfeld 143,619
Water, purifying, G. Demailly 143,676
Water traps, forming, W. A. Butler 143,665
Wool, etc., cleansing dyed, J. E. Ackroyd 143,603

APPLICATIONS FOR EXTENSIONS.

Applications have been duly filed, and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:

26,860.—MAKING TINWARE.—S. J. Olmsted. Dec. 31.
26,952.—LAMP.—G. Neilson. Jan. 7.
30,467.—SINGEING PIGS.—A. Denny *et al.* Jan. 14.

EXTENSIONS GRANTED.

25,796.—JACQUARD MACHINE.—A. Babbett.
25,797.—HARVESTER.—E. Ball.
25,807.—HEM FOLDER.—L. Clark.
25,814.—SLEEPING CAR.—J. Danner.
25,843.—CULTIVATOR.—T. McQuiston.
25,862.—WEEDING HOE.—J. M. Adams.
25,867.—COVERING SADDLE TREES.—J. Maclure.

DISCLAIMER.

25,796.—JACQUARD MACHINE.—A. Babbett.

DESIGNS PATENTED.

6,956.—DOOR KNOB.—J. O. Hollis, Boston, Mass.
6,957.—RUBBER BOOT.—L. L. Hyatt, New Brunswick, N. J
6,958.—STOVE.—J. Martino, Philadelphia, Pa.
6,959.—PICTURE FRAME, ETC.—J. Nonnenbacher, N. Y. city
6,960.—STATUE.—J. Rogers, New York city.
6,961.—KITE.—S. M. Simonds, Philadelphia, Pa.

TRADE MARKS REGISTERED.

1,488.—BLACKING.—L. Amson & Co., New York city.
1,489.—BLACKING OR GREASE.—L. Amson & Co., N. Y. city.
1,490.—BARRELS OF WHISKY.—Derby *et al.*, St. Louis, Mo.
1,491.—CORSET SPRINGS.—F. L. Egbert, New York city.
1,492.—SHIRTS.—Kohn & Co., Philadelphia, Pa.
1,493.—BRUSHES.—J. M. C. Martin, New York city.
1,494.—CLOTHES WRINGERS.—Queen City Wringer Co. Cincinnati, O.
1,495.—BAKING POWDER.—Royal Baking Powder Co. New York city.
1,496.—STOVES.—J. Spear & Co., Philadelphia, Pa.
1,497.—GRINDING MILLS.—Straub & Co., Cincinnati, O.
1,498.—RUBBER BOOTS.—Candee & Co., New Haven, Ct.
1,499.—QUICKSILVER FLASKS.—Quicksilver Mining Co., New Almaden, Cal.
1,500.—WINDOW POLISH.—H. M. Wade, Philadelphia, Pa.
1,501.—MEDICINE.—J. L. Graham, Pittsburgh, Pa.
1,502.—LUBRICATING OIL.—Leonard *et al.*, New York city.

SCHEDULE OF PATENT FEES:

On each Caveat $10
On each Trade-Mark $25
On filing each application for a Patent (17 years) ... $15
On issuing each original Patent $20
On appeal to Examiners-in-Chief $10
On appeal to Commissioner of Patents $20
On application for Reissue $30
On application for Extension of Patent $50
On granting the Extension $50
On filing a Disclaimer $10
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On an application for Design (7 years) $15
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