ENGINEERING INVENTIONS.

A traction cable grip has been patented by Mr. William Martin, of San Francisco, Cal. The invention provides for a frame with grooves in which planks are fitted to slide, rollers mounted on the planks, brakes for the rollers, and means for forcing the rollers upon a cable, and the brakes upon the rollers, with various novel features, so that the running cable will be taken hold of gradually without wear thereto or shock on the car.

A balanced slide valve has been patented by Mr. Daniel A. Woodbury, of Rochester, N. Y. This invention provides for such construction as relieves the sliding faces of both the main and cut-off valves to any desired extent, a relief plate being so adjustable as to bear the entire pressure of the steam, by means under the control of the engineer, and so contrived as to accomplish the same by one movement of the adjusting device.

A car seal has been patented by Mr. Thos. P. Wentworth, of Elroy, Wis. The car having a vertical slot for receiving a seal key, a grooved block is held on the inner surface of the car and a latch held to slide in the groove, the latch adapted to engage and lock in place a seal key inserted through the slot, and having one beveled end and a head on the opposite end, making a simple and effective car door seal, the seal key having to be broken or destroyed to be removed from the outside.

MECHANICAL INVENTIONS.

A plowshare tongs has been patented by Mr. George M. Sebastian, of Arkansas City, Kansas. The tongs are composed of three members pivoted together, with a brace clamp adapted to be attached to the tongs and to the object held therein, the jaws and handles being arranged to grasp both the plowshare and the bar, holding the edges thereof to be welded together in close contact, so that a true and perfect weld may always be effected.

AGRICULTURAL INVENTIONS.

A soil pulverizer has been patented by Mr. Benjamin Deem, of Spring Hill, Kansas. In this invention the roller comprising the cylinder or drum is fitted with a core upon the axle of the carrying frame, the drum having a series of rows of slots, combined with segmental cutters, and their inner surfaces having projections or tenons fitted into sockets or mortises.

A plow has been patented by Mr. William L. Quick, of Molino, Tenn. The invention provides for such construction that plows can be readily adjusted for various kinds of plowing; a small plow can be attached to one end of the foot for cultivating close to rows of plants, and a larger plow attached to the other end for opening the furrow between the rows, etc.

A hand corn husker has been patented by Mr. Robert C. McMinn, of Golden City, Mo. The invention consists of a metal plate forked at the outer end in the form of hollow bent claws, and in means for adjusting the strap to suit different sized hands, or to pass over a mitten, so a better hold is taken on the ear of corn, and the husker is made to act more efficiently and with greater ease.

MISCELLANEOUS INVENTIONS.

A fastener for knob spindles has been patented by Mr. Le Grand Terry, of Horseheads, N. Y. This invention consists in a novel construction and arrangement of parts of knob shank, notched escutcheon, etc., making a door knob which can be locked so it cannot be turned, thus locking the door.

A neck yoke has been patented by Mr. Cyrus R. Furey, of Logansport, Ind. This invention provides a new and improved attachment for neck yokes for holding the neck yoke ring and the martingale strap, and consists in a neck yoke having a spring snap at each end.

A fireproof hanging ceiling has been patented by Mr. Louis Lafond, of New York city. This invention consists in a ceiling constructed with iron bars placed edgewise on the flanges of the iron girders, and carrying the iron hangers that support the ceiling tiles, whereby the latter will be firmly supported.

The art of treating cigars is the subject of a patent issued to Mr. James D. Culp, of San Felipe, Cal. The invention consists in applying to cigars a coat or dressing of paraffine dissolved in naphtha, to improve both their flavor and burning quality, render the wrapper more flexible and tough, and prevent drying out of the filler.

An inkstand has been patented by Mr. William O. Rastetter, of Dalton, Ohio. It is surrounded by a removable casing, on which tubes are formed, in the lower ends of which are corks or other stoppers to form feet, making a soft and yielding support for the inkstand, and preventing injury to the points of the pens passed into the tubes.

A fire escape has been patented by Mr. Eli Frazier, of North Lawrence, Kansas. This invention relates to that class of fire escapes in which an endless rope or chain is used for lowering persons, each one descending by his own weight, the friction of the rope on pulleys preventing the descent from being too rapid.

A cash carrier has been patented by Mr. George H. Spring, of Le Mars, Iowa. This invention relates to devices used in large stores for carrying the cash from the counters of the clerks to the cashier and returning the change, and involves the use of a car on a horizontal wire, being designed to simplify this system of cash carriers and expedite their action.

A cream can gauge has been patented by Mr. Charles E. De Long, of Vermillion, Dakota Ter. The can has a longitudinal slot with lateral notches at one end, and a strip creased to form pockets along the side edges, into which pockets the side edges of the slot in the can are passed, whereby the creased slip is held in the slot, a strip of glass being held in the creased strip and numerals or other characters produced thereon.

A method of hardening or improving resins of all kinds has been patented by Mr. Albert Kissel, of Frankfort-on-the-Main, Germany. This invention provides for the conversion of the acids in balsams, resins, and their compounds, by means of lime or other alkaline earths, into their respective salts, in order to harden the resins, resinous by-products, or resin preparations.

A wheel scraper has been patented by Mr. John W. Whipp, of Van Alstyne, Texas. The invention consists in a frame adapted to partly embrace the wheel and carrying longitudinal and transverse scraping wires, with means for adjusting their tension, the transverse wire having means for adjusting it vertically, and the frame being held adjustably on an arm or bar on the axle.

A door knob has been patented by Mr. Edwin A. Johnson, of Allegheny City, Pa. This invention relates to that class of knob attachments in which a serrated spindle is engaged by the edge of a key inserted through an aperture in the knob shank, and its object is to facilitate the adjustment and securing of a door knob on the knob spindle according to the thickness of the door.

An oil lamp feeder has been patented by Mr. William H. Dillon, of Glasgow, Ky. This invention consists of a special construction and combination of parts having for its object to use oil conducted like gas in pipes, to raise the lamp wick and to open the valve which admits oil thereto at the same movement; also to raise or lower the wick without operating the valve.

A bow hook for neck ties has been patented by Mr. Julius Schlesinger, of Hoboken, N. J. It is self-adjusting, formed of a piece of wire bent to form a prong, from the upper end of which two parts are inclined downward and outward on opposite sides, these parts having hooks on their free ends for receiving the shield of the bow, and the prong having a bend at its upper end.

A lock joint for fishing rods has been patented by Mr. Justice Webb, of Georgetown, Ky. With a sleeve having an annular ridge or collar and two studs is an additional sleeve fitting on the front end carrying a sliding sleeve with two L-shaped slots for receiving the stud on the other sleeve, making an improved lock joint for firmly holding together the sections of a fishing rod.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name 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 mail, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) S. B. G. asks the rule to find the dominical letter for any year in any century. A. Rule: Divide the number of centuries and the years of the given century each by 4, and the years again by 7; multiply the remainders respectively by 2, 2, and 4; add together the three products, and increase their sum by 1; then divide the whole sum by 7, and the remainder will be the ordinal number of the dominical letter required. If 0 remain, it will be the 7th, or G. In bissextile years two dominical letters are used. Example: 1884.

$\frac{18}{4}$ = 4 and 2 rem. $2 \times 2 = 4$
$\frac{84}{4}$ = 21 and 0 rem. $0 \times 2 = 0$
$\frac{84}{7}$ = 12 and 0 rem. $0 \times 4 = 0$

4
Add 1

5

which, being less than 7, is the ordinal number for E; it being a bissextile year, F precedes E until the 1st of March, the order of the letters being reversed as applied to the succeeding years.

(2) E. H.—The disintegrating properties of steam heat at 60 pounds pressure are well known to engineers and the steam heating trade. Paper is never used except as outside covering for low pressure steam pipes, and then only as a makeshift.

(3) A. S.—You are right. Brakes should never be strongly applied to a moving train on a bridge of any size, and the best railroads prohibit such practice; when necessary to reduce speed in crossing, the brakes are applied before reaching the bridge and then released when crossing. Very likely many bridges have had their lives much shortened, and many accidents have happened, from neglect of this rule.

(4) P. B. asks how large a carbureter, or how many feet of evaporating surface, with gasoline of 87 or 88 gravity, would be required to get gas enough for eight burners of five feet an hour each. A. About 12 square feet. Less will do when the carbureter is freshly charged. 2. Suppose a ball of 25 miles in diameter could be placed 500 miles on this side of the full moon, would it not appear to be a spot on the moon to our naked eye? A. You would scarcely be able to discern a spot or shadow of a ball 25 miles diameter between the full moon and the sun at the distance named with the unaided eye. A telescope would easily show it.

(5) E. J. R. asks for a receipt of a cheap glazing for common earth ware, such as is used for common gray or brown ware. A. A brown cottage glaze consists of litharge 60 parts, flint 32 parts, brown slip 8 parts. This must be used of about the same consistency as cream color glaze, and will stand the highest temperature of heat in a common glazing oven. See also glazes for pottery, SCIENTIFIC AMERICAN SUPPLEMENT, No. 313.

(6) D. J. P. asks how the birch beer sold in saloons is made. A. A very excellent sparkling beer can be made from the sap of the birch by adding to it from 8 to 10 per cent of its weight of sugar and 0·2 to 0·3 per cent of tartaric acid. According to another authority, the best product is made by adding to 100 pounds of the sap about 6 ounces of tartaric acid and 8 to 10 (or if a stronger product is wanted 16 to 24) pounds of sugar and 3 ounces of a strong almond milk. The mixture is fermented in the usual manner, put in bottles with a little more sugar, and securely sealed. Several formulas for similar effervescing beverages are given on page 4308 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 270.

(7) W. R. wishes to know what is the right temperature to raise family bread at. A. The raising of the bread should take place at a temperature of from 90° to 100° F., and the heat in the oven should be from 400° to 440° F. We suggest as interesting in this connection, Mr. George M. Whitaker's article on Theory and Practice of Bread Making, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 170, and also Dr. Graham's paper on the Chemistry of Bread Making, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 222.

(8) L. H. F. asks: 1. What is the *modus operandi* to cook raw meats, especially corned beef, economically and with the least shrinkage, looking to its preservation? A. Each packer has his own special *modus operandi*, which is kept "strictly secret." In a general way the meat is first cooked in the ordinary way, then put into the can and sealed, boiled in this condition for some time longer, when it is removed and a vent opened in the can in order to allow all gases, etc., to escape, again hermetically sealed, boiled for a few minutes and the operation is completed. 2. Why cannot cooked corned beef and animal soups be kept from becoming rancid after being put up in air tight (so called) cans? And if deleterious gases are generated, say how caused and how prevented. A. By the foregoing process all deleterious gases are driven off, and once sealed the articles remain good for years. Deleterious gases are only induced by decomposition resulting from access to the air.

(9) F. P. H. desires to know how aluminum is taken from the ground. A. The aluminum in the ground is in the form of aluminum oxide; this is treated so as to form the double chloride of aluminum and sodium. The latter is then decomposed by heating it with metallic sodium, fluorspar or cryolite being added as a flux. SCIENTIFIC AMERICAN SUPPLEMENT, No. 50, gives in more detail the method of manufacture. Recently improved methods have been introduced, but they are essentially the same as the foregoing outline.

(10) H. M. B. asks how to make cup grease for lubricating machinery, something light colored. A. In a small boiler dissolve from 56 to 60 pounds of soda in about 3 gallons of water. In a 60 gallon boiler melt tallow, and to it add palm oil, each in quantity according to season. In summer weather, tallow, 1 cwt. 3 qrs.; palm oil, 1 cwt. 1 qr. In winter, tallow, 1 cwt. 1 qr.; palm oil 1 cwt. 3 qrs. In spring or autumn, tallow, 1 cwt. 2 qrs., palm oil, a similar quantity. As soon as the mixture boils, put out the fire and let the mixture cool down gradually, frequently stirring while cooling. When reduced to blood heat, run it off through a sieve into the solution of soda, stirring it well to insure a perfect mixture of the ingredients.

(11) S. G. writes: I keep a boarding house to make a living. For several years I have put up my own jellies and preserves, and in order to make them cheap have used apple juice to make jelly; but I find it will ferment in a few weeks' time. Can you tell me of an anti-ferment that will stop fermentation, and in what proportion is it used to a gallon of juice? A. ¼ to ½ per cent of formic acid is said to possess powerful preservative properties and to be particularly suitable for adding to fruit juices. Add it to the boiling mass. Salicylic acid is likewise used.

(12) D. D. L. desires to obtain, at a moderate cost, a compound by mixing two or more ingredients which will harden in a few minutes after being united. To answer the purpose it should become quite firm. A. If equal parts of common calcined plaster of Paris and of potassium sulphate be mixed together, they will harden in a moment with less than an equivalent weight of water; so much so indeed that the mixture cannot be poured out of the vessel. The rapidity of hardening therefore can be made to vary with the percentage of water, the mass solidifying even if 6 parts of water be used.

(13) M. B. T. writes: 1. Pure water at 60° temperature has specific gravity of 1. What is its specific gravity at 70°, 80°, and 90°? A. At 70° the specific gravity would be 0·99897, at 80° 0 99768, at 90° 0·99599. 2. Is the expansion of water regular from freezing to boiling? A. The expansion is not regular. It first contracts up to 39·2° Fah., and then expands. 3. Would sirup or honey having specific gravity of 1·4 at 60° expand the same as water with each additional 10° or 20° of heat? A. It is not likely that it would; we have no information on this subject, however. 4. What per cent of sweet has sirup that has a specific gravity of 1·4? A. About 86·5 per cent of sugar.

(14) E. J. G. asks for a recipe to prepare paper for the "blue process" of copying. A. Use two separate solutions of:

Iron and ammonium citrate	1 oz.
Water	4 oz.

and

Potassium ferricyanide	1 oz.
Water	4 oz.

For use, mix equal quantities and float paper for two minutes.

(15) J. B. H. asks the ingredients impregnating the "indelible copyable ribbon" used on type writers. A. The ink which has generally been used for the ribbons consists of:

Aniline black	½ oz.
Pure alcohol	15 "
Concentrated glycerine	15 "

Dissolve the aniline black in alcohol and add the glycerine. Recently however an ink has been prepared by using printing ink and diluting it with boiled linseed oil and adding an iron salt. We cannot vouch for the following formula, but it is similar to what is

used: 16 parts of boiled linseed oil varnish, 6 parts of the finest lampblack, and 2 to 5 parts of iron protochloride, prepared by dissolving the iron perchloride in absolute alcohol, and adding sufficient pulverized metallic iron to reduce it to the protochloride.

(16) W. L. S.—To make very black drawings with India ink, a correspondent suggests that the pigment be cracked into small pieces and soaked in dilute ammonia water, when with an occasional shaking it will dissolve in two days; but if the ammonia is too strong, it will turn the ink brown.

(17) P. E. McD.—The limit of expansion of air has never been determined. Your other questions are too indefinite for reply here.

(18) M. J. S.—Oars are better than a screw with shaft, etc., for driving a small boat where you have only muscle power. How to build small boats of various kinds is fully described in back numbers of our SUPPLEMENT.

(19) A. H. T. & S.—Stereotypes or electrotypes which show newspaper pages, pictures, etc., in reduced or enlarged sizes are made by some of the photo-engraving processes. Such printing is also done to a considerable extent by photolithography.

(20) V. J. desires information as to how to get rid of roaches. A. Pulverized borax sprinkled around the infested places will cause them to flee.

(21) F. S. B. writes: Will you inform me what will harden tar for covering roofs. Have used resin and sulphur, but the sun makes it run. Is there anything besides asbestos that will harden it? A. You can boil the tar down as far as possible, and then cover the roof with gravel stones of a quarter to half an inch in size; or perhaps a more satisfactory method would be to mix the tar with hydraulic cement. We understand that this compound forms a very acceptable roofing material.

(22) J. L. R. asks: What chemicals will prevent the fermentation of malt soil, as it invariably, during the summer months, bursts the barrels containing it? A. Use either copperas or zinc chloride in the proportion of about one pound dissolved in one gallon of water to each barrelful.

(23) H. G. W. asks with what he can put a polish on soft gypsum. A. If it is in the rough condition, rub with finely powdered pumice stone or dried shore grass and water, then afterward with a paste formed of finely powdered and sifted slaked lime and water. The rough polish thus produced is finished by friction with finely powdered talc or French chalk until a satiny luster is produced.

(24) G. B. L. says: I have two taper wooden cones 6 inches diameter at one end, 3 inches at the other, respectively, on shafts 3 feet apart, and driven by a 1½ inch leather belt; this belt slips. What can I do to produce an even speed on the driven cone? The weight to drive can be turned by a 10 inch crank. A. Rub a little good beeswax upon the inside of the belt. If it does not drive the work at the proper tension, it is an indication that the pulleys are too small. Cone pulleys are not equal in power to straight ones with a given belt, and from their peculiar shape cannot properly carry wide belts.

(25) A. M. asks how he can get or make silver thimbles white when they are tarnished. A. Either dip them into a dilute solution of nitric acid (aqua fortis) or else silver plate them. For description of the latter process see SCIENTIFIC AMERICAN SUPPLEMENT, No. 310, under head of electrometallurgy.

(26) T. T. asks how to prepare the compound used by wood engravers to make a transfer from a print on to a type metal block. A. One ounce caustic potash to half pint alcohol should be made into a solution, with which the print is wetted for a few minutes; the type metal block is then brushed over thinly with Canada balsam, the picture put on face down, and the two run between rollers.

(27) P. S. asks: Can soluble glass (water glass) be used for inside painting? Will it mix with dry colors or mixed paints? How high a temperature will it resist or withstand? Will it be affected by dampness, or by change of temperature, etc.? A. Soluble glass can be used for inside painting. It forms the basis of the silica paints. It is quite permanent, and is not easily decomposed. It will effloresce and tend to dissolve by dampness, and is soluble in water. A good description of its properties is given on page 5061 of the SCIENTIFIC AMERICAN SUPPLEMENT, No. 317.

(28) N. F. W. says: I have an upright tubular boiler of wrought iron 2 feet high and 1 foot diameter; the body is riveted from top to bottom with 16 rivets, I think ¼ inch rivets, the thickness of the boiler is about ⅛ inch. Should like to know about how much steam would be safe to put on it; should like to carry 80 pounds if safe. A. It would be safe at 80 pounds, if of good material and well made. We advise you to have it tested by water pressure to at least 120 pounds before using it under steam pressure.

(29) L. W. asks: Can you tell me what causes wrigglers in wells, and what will prevent or destroy them? A. These pests only occur where the well is foul; the well should be cleaned out.

(30) A. C. A. writes: 1. Could I not make my own rubber cement, with your kind assistance? It must stand hot and cold water. A. Rubber cement consists of one part raw rubber dissolved in four parts naphtha. 2. How could I vulcanize the soles of a pair of boots after being cemented on? It is necessary for the edges will give. A. It will be impossible for you to vulcanize the soles of a pair of boots after they are cemented on. A full description of the vulcanizing process is given in back numbers of the SCIENTIFIC AMERICAN SUPPLEMENT. We do not know what you mean by rubber varnish; it is probably the same thing as the cement.

(31) J. F. N. desires to know whether hydrogen peroxide would be desirable to use in bleaching resin soap, and if not, what can be used? A. We would hardly recommend hydrogen peroxide for bleaching resin. See SUPPLEMENT, No. 319, for a description of this agent. Watt in his recent work gives the following: "When soap is made from dark colored goods, considerable improvement may be made by adding a moderate quantity of solution of chloride of soda after the first operation of saponification is complete." The best resin soap is made as far as possible from light colored resin, and is generally yellow or green. In the latter case indigo is added. We would recommend you to consult Mr. Watt's book. It is entitled The Art of Soap Making, and is worth about $2.

(32) J. G. R. asks if there is any formula for removing stains from a marble slab, caused by the acid from lemon juice. A. We should think that any stains caused by lemon juice would be easily removed by the application of cold water. The following however is strongly recommended as suitable for removing stains from marble: Take two parts common soda, one part of pumice stone, and one part of finely powdered chalk; sift it through a fine sieve, and mix it with water, then rub it well all over the marble, and the stains will be removed; then wash the marble all over with soap and water, and it will be clean as it was at first.

(33) F. K. McC. writes, asking directions how glass is stained permanently. A. Glass staining may be done at home by the following process: Spread over the glass a strong gum water, and when dry lay it over the paper on which the design is sketched, and trace with a fine hair pencil all the outlines. Dip the tube-like pencils in the colors, and let them flow out upon the glass; have a care, and not touch the pencil to the glass. The lights and shades are produced in a variety of ways; one of the easiest, and especially to beginners, is to take a goose quill cut in the shape of a pen, without the slit, and with it carefully take out the lights by lines and little dots. This part of glass staining is the most exacting and difficult, as much of the effect depends upon the shading. The glass is then ready for the kiln.

(34) A. W. M.—Full information about making lager beer, with details, and proper amounts of the ingredients to be used, will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 217. Potatoes mix only by the ordinary means by which other plants mix; that is, by the crossing of the pistillate and stamens of the flowers. Potatoes never "mix" in the hills; new varieties are produced from the seed bulbs.

(35) P. H. L.—The pitch of a roof is measured in parts of the horizontal line from peak to eaves. In a quarter pitch, the height would be one-quarter of the width from the plumb line of the peak to the eaves. A whole pitch would be as high as wide, and equal 45°.

(36) F. W. C. C. writes: Can you inform me whether there are in the United States or Canada any institutions where the theory and practice of a mechanical engineer can be learned? If you know of any, or could put me in the way of acquiring the information, I would be much obliged to you. I am at present in the Northwest surveying, but intend returning East in the fall. Any information sent to the inclosed will find me during the summer, and will be most gratefully received. A. Write to the Stevens Institute, Hoboken, N. J., an admirable institution for your purpose.

(37) J. C. H.—To make Berlin bronze, clean the metal by first dipping for a moment in nitric acid, then rinse quickly in running water, and rub with sawdust. For the dip, to 1 gallon hot water add half a pound each of perchloride of iron and perchloride of copper. Let the articles remain in this solution no longer than for the required color, rinse well, dry, and polish with warm sawdust or a rag wheel. Copper iron by cleaning and dipping in a solution made with 3 ounces sulphate of copper, 3 ounces sulphuric acid, to one gallon water.

(38) H. T. asks: Is crude petroleum of 55° specific gravity much more dangerous to handle than the refined coal oils in general use for lighting? I do not want to use the crude article for lighting, but to run an engine—gas being too expensive at $4 per thousand cubic feet here, and the power required being mainly intermittent, and therefore steam power unavailable. A. Crude petroleum is used for generating steam, but cannot be trusted to burn with a wick. It is blown from a blow pipe with air or steam. You will find interesting articles upon petroleum as fuel in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 331 and 404.

(39) A. J. McI.—On slight exposure to the air a colorless solution of barium peroxide forms the whitish barium carbonate by taking up the carbonic acid in the air. Naturally the reaction is facilitated by the artificial introduction of carbonic acid into the surrounding atmosphere. There is also a so-called "ground glass varnish," sold by dealers in photographic supplies, which when poured on glass will rapidly dry, forming an opaque surface. Certain rare organic chemical compounds are said to possess a great sensitiveness to light, but they are not easily procurable in this country.

(40) F. L. L.—You will require for a 3 horse power boiler about 45 square feet of heating surface. The form that you have sketched we do not approve of. A bent coil around the fire chamber is better. Multiply the circumference of the pipe by its length for surface.

(41) L. B. C. asks: Will you be kind enough to tell me a cheap and harmless but efficient remedy for the falling off of the hair, and also an article to promote a healthy and abundant growth? A. The falling out of the hair may be due to many causes, and therefore no specific remedy can be recommended. Read The Hair, its Use and its Care, by Dr. J. V. Shoemaker, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 388. Morfit recommends the following. Scald black tea 2 ounces, with 1 gallon boiling water; strain, and add 3 ounces glycerine; tincture cantharides ½ ounce; and bay rum 1 quart. Mix well by shaking, and then perfume. An excess of alum in bay rum is also recommended. The growth of the hair is dependent largely upon the healthfulness of the individual, and hence no preparation can be counted as sure for this purpose, although there are many formulas such as the foregoing in existence purporting to accomplish their object.

(42) J. S. writes: Would you please let me know what the ingredients of sperm candles are, also the quantity of each ingredient? A. Melt together over a water bath 100 parts stearic acid, and 10 to 11 parts of bleached beeswax; but to insure success, the mixture must remain over the bath from 20 to 30 minutes, without being stirred or agitated. At the end of that time the fire is to be extinguished and the fluid allowed to cool until a slight pellicle is formed on the surface, when it is cast direct into the moulds, previously heated to the same temperature, with the precaution of avoiding stirring the mixture, which would cause opaqueness.

(43) H. S. asks (1) for an inexpensive means of magnetizing ordinary printing type. A. Ordinary type cannot be magnetized. 2. I want to construct a battery to experiment with. Will you direct me how to do it? A. Consult SUPPLEMENT, Nos. 157, 158, and 159, for information on batteries.

(44) D. B. asks: 1. What is the ratio of air of ordinary pressure (30 inches) to air reduced to liquid? (I do not expect more than an approximation.) A. We believe air has not yet been reduced to a liquid, although oxygen and nitrogen have. 2. What would be the rising speed of a body propelled in opposition to gravity by a constant force double that of gravity, and what the speed, raising force being four times gravity? A. The rising speed would be equal to the falling velocity caused by gravity, and 3 times that. 3 Is there any combination of lenses that would magnify 1 square cm. 625 times (25 times lineally) preserving a uniform enlargement, distinction, and proportion of different positions? A. A combination of two plano-convex lenses, as in a Ramsden eye piece, will be nearly aplanatic. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 399. 4. What is the highest practicable magnifying power for very minute objects? A. 2,000 to 3,000 diameters. 5. What is angular aperture of microscopes? A. Angular aperture is the extreme angle of the light that can be utilized for definition in a microscope objective.

(45) M. M. asks for a good and effective method of destroying the caterpillars on a grape vine, also a method of preventing them from coming on. A. There are no fewer than nineteen insect enemies of the grape, and of these, seven or eight assume the caterpillar form at some stage of their development. If the fruit has not been formed, they may as a general thing be destroyed by sprinkling the vines with a solution of Parisgreen or London purple with water, say a heaping tablespoonful of the former to two gallons of the latter. The vines may be dusted with a mixture of the poisons and plaster or flour, in the proportion of 1 to 100. After the fruit has formed, a kerosene soap emulsion sprinkled on the vines would be destructive to the pests without endangering human life. Take about four pounds of common yellow bar soap, one gallon of kerosene, and one gallon of water; heat the mass over the stove, stirring it till it forms a homogeneous thick yellowish liquid, then remove the mixture from the stove and continue the stirring until it becomes cool. This should be largely diluted with warm soft water, and it will be permanent. Pyrethrum powder mixed with plaster is also used to good effect, sprinkled on the vines.

(46) R. B. writes: I am manufacturing a liquid in which I use 5 per cent of acetic acid: the only difficulty I have is the smell retained by the acid. What can I use or add to overcome this? A. It is impossible to overcome the odor of acetic acid except by adding some other article of greater odoriferous power. Acetic ether or some soluble acetate, such as the sodium or the potassium salt, might be used. There are various aromatic vinegars such as the following, that may be suggestive: Take of camphor 1 ounce avoirdupois; oil of cloves, 1 drachm; oil of cedrat and lavender, of each 40 grains; oil of bergamot and thyme, of each 20 grains; oil of cinnamon, 10 grains; glacial acetic acid, half a pound; mix in a stoppered bottle and agitate until the whole of the camphor is dissolved.

(47) O. C. R. says: I have an acoustic telephone a quarter of a mile long, using No 18 iron wire with 9 inch diaphragm made of photographer's plate. It works pretty well, excepting the necessity of loud speaking; would No. 20 copper wire or a different diaphragm produce better results? A. If you will try a heavier diaphragm and use a wire cable cord, you will succeed better. You will find a thin wooden diaphragm very effective. 2. What would the materials cost for the construction of the dynamo machine described in your SUPPLEMENT, and are there no manufacturers making such small machines? A. $8 or $10. Similar machines are for sale by our leading dealers in electrical supplies.

(48) E. H. T.—Porous cups are merely unglazed earthenware. We cannot say just what the difference in force would be by using cups that were not wholly porous; but it would be in favor of the cup which is porous throughout. There are two methods of fastening electrodes to the carbons. One is to cast a lead cap directly on the carbon, the other is to make an electro deposit of copper on the end of the carbon and then solder the wires to the copper. Clamps are generally preferred, however; they are for sale by all dealers in electrical goods.

(49) O. B. S. asks for a number one recipe for cementing leather together. A. Take of common glue and American isinglass equal parts; place them in a glue pot, and add water sufficient to just cover the whole. Let it soak ten hours, then bring the whole to a boiling heat, and add pure tannin until the whole becomes ropy or appears like the white of eggs. Apply it warm. Buff the grain of the leather where it is to be cemented; rub the joint surfaces solidly together, let it dry a few hours, and it will be ready for use; and if properly put together, it will not need riveting.

(50) W. D. F. asks (1) information as to any powder or combination of powders that when mixed with hot water and spread on white paper will produce a fine gloss. A. The glazing of paper is generally effected during the process of manufacture. Coating the paper with a dilute solution of gum water might accomplish your purpose. 2. Do you know in what branches the United States Civil Service Board examine applicants, in making application for a position in the United States Treasury Department? A. *a*, Orthography, penmanship, and copying. *b*, Arithmetic, fundamental rules, fractions, and percentage. *c*, Interest, discount, and elements of bookkeeping and accounts. *d*, Elements of the English language, letter writing, and the proper construction of sentences. *e*, Elements of the geography, history, and government of the United States. 3. I saw men on the street selling a fluid in bottles, that when put on brass or copper will make it look as if it was silver plated; could you tell me what it is? A. A good silvering solution consists of a solution of 1 part potassium cyanide in 6 parts water; add to this a concentrated aqueous solution of silver nitrate (free from acid) until the precipitate is redissolved. Mix this solution with fine chalk, and apply after cleaning the objects.

(51) G. W. W.—1. Malleable castings are worth about 12 cents per pound. 2. Gasoline is a product of the distillation of petroleum, having a gravity of about 95° B. to 80° B. It is worth from 18 to 35 cents per gallon in bulk, according to its quality. 3. The iridium pointed fountain pens seem most popular. 4. Mutilated silver coin can be sold at the United States Treasury or in quantity at the United States Assay Office, and has a value of about $1.20 per ounce.

(52) M. N. B asks what ingredients are necessary to make a hektograph. A. The composition is as follows:

Good ordinary glue	100 parts.
Glycerine	50 "
Barium sulphate (finely powdered) or the same amount of kaolin	25 "
Water	375 "

First dissolve the glue in water, heat it, add then the glycerine.

(53) A. F. O. asks how the water in bottles is frozen. A. By placing the bottles of water in the brine bath of a refrigerating machine or in a mixture of ice and salt same as used for making ice cream.

(54) H. F. says: I have a call for a machine to concave razors. Do you know if there is such a machine, and where I could get one? A. You will need only a polishing lathe with a fine emery wheel on one end of the spindle and a buff upon the other end.

(55) P. R. asks what steam pressure it would be safe to use in a boiler made of three thirty-seconds iron, 4 feet long, 15 inches diameter, with 12 1 inch flues. I want to run a cylinder 2x5 inches. Is the boiler large enough for such an engine? A. 30 pounds pressure if the seams are double riveted. Boiler is large enough for the engine.

(56) G. H. J. asks to be informed what process is used to cause the bones in canned fish to lose their bony properties so as to be easily chewed up. A. The large bones are removed; otherwise nothing is done to affect in any way the bony portion of the fish.

(57) M. & W. ask what infusorial earth is. A. Infusorial earth is diatomaceous silica or the silicious portions of the remains of microscopic life. Its chief use is for polishing purposes.

(58) W. B. E.—For steaming logs for veneering, any box that can be made so tight as not to waste steam will answer. Exhaust steam from the engine is much used for such purposes. The principal point is to get the wood thoroughly water soaked, when the heat of boiling water will make it cut freely. There is no necessity for pressure in the steam box.

(59) E. F. N.—There are a number of receipts for browning gun barrels. The following one is good for amateurs: Wet a piece of rag with chloride of antimony, dip it into olive oil, and rub the barrel over. In 48 hours it will be covered with a fine coat of rust. Then rub the barrel with a fine steel scratch brush, and wipe with a rag dipped in boiled linseed oil. Very complete directions for browning gun barrels and other useful hints may be obtained from a book, "Shooting on the Wing," by John Phin.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

August 12, 1884,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Advertising device, T. Meikle	303,307
Air drying apparatus and process, R. S. Jennings	303,374
Alarm. See Burglar alarm. Fire alarm.	
Artists' colors, box or receptacle for, C. Davis	303,495
Asphaltum from the residue of tanneries, making artificial, C. Lortzing	303,301
Axle lubricator, A. D. Howe	303,283
Baling press, F. X. Maurer	303,305
Barrel, knockdown fruit, C. F. Bartram	303,254
Battery. See Electric battery.	
Beam wheel, adjustable, J. W. Stafford	303,405
Bed bottom, spring, F. J. Maier	303,393
Blotter, J. F. Adams	303,250
Blower, fan, M. C. Huyett	303,375
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Boot and shoe heel shaping and burnishing machines, jacking device for, S. A. Lentz	303,377
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