

ENGINEERING INVENTIONS.

A gas engine has been patented by Mr. George M. Allen, of Terrysville, Conn. The piston is moved in the working cylinder by the expansion of heated air and gases, and there is no explosion, the engine being practically a hot air motor in which the air is admitted greatly in excess of that needed for the combustion of the gas.

A car step has been patented by Messrs. Clarence C. Baker and Odaville Yates, of Albuquerque, N. M. The object of this invention is to provide an improved folding step for freight cars or station platforms, the step and its hangers being substantially pivot jointed, for securing interlocking and mutual support of its parts, and being readily folded and unfolded.

A straightway valve has been patented by Mr. Alexander B. Rohney, of Montreal, Canada. The valve is made in U-form, with its head or bend serving as the valve face, and the side arms, affording a free passage between them, shaped as cams, to act against shoulders of the valve case in seating the valve, with other novel features, making a valve with few and simple parts, and which is durable.

MECHANICAL INVENTIONS.

A gear wheel has been patented by Messrs. Benjamin W. and Joseph L. Leeson, of Litchfield, Ill. The teeth are convex on their backs and concave on the front or driving sides, giving them a better hold with chain gear, and they have a rubber cap or covering fitting tightly around them, so that a chain or gear wheel thus made will run almost as noiselessly as a pulley driven by a belt.

AGRICULTURAL INVENTIONS.

A cotton planter and fertilizer distributor has been patented by Mr. Pleasant R. Houpe, of Oak Forest, N. C. The hopper is made with inclined angular sides, one of which is bolted flat against the inclined handles, which form a support for the hopper, and there is a stirrer within the hopper, with various other novel features.

MISCELLANEOUS INVENTIONS.

A weather strip has been patented by Mr. William J. Devers, of Providence, Pa. The invention relates to that class of weather strips in which the strips are secured to the door along its edges, and consists in a novel construction and arrangement of parts.

A fire kindler has been patented by Mr. Clarence J. Canan, of Omaha, Neb. It consists of a corn cob coated or saturated with inflammable material, such as resin and tallow, pitch, etc., and a transverse supporting and ignition splint, being a cheap, clean, and effective fire kindler.

A combined hinge and blind fastener has been patented by Messrs. Warren S. Dwinel and Earl P. Mason, of Providence, R. I. The object of this invention is to improve lock hinges for window blinds, to effect which the construction is novel, and the device is cheap, strong, durable, and easy to operate.

A horse blanket has been patented by Mr. Clarence J. Canan, of Omaha, Neb. It is double breasted, and has two flaps at the front end, both of which are folded over the horse's breast, and held in place by means of straps and buckles, one of the flaps having a transverse slot through which the other flap can be passed.

A stench trap has been patented by Mr. Herman Pietsch, of Flatbush, N. Y. An exterior bowl or cup is connected to the inlet and outlet pipes, and so combined with a glass tube and cup as to make a trap of simple construction, which flushes and cleans itself automatically after use, and is made transparent, so the contents can be seen at all times.

A wagon jack has been patented by Mr. William H. Gray, of Neapolis, Ohio. It consists of a horizontal bed frame and vertical guides, in combination with a vertically sliding frame carrying two brackets for engaging the rack or wagon box, with a pawl and ratchet mechanism, for lifting racks and wagon boxes from the running gear of wagons.

A gin saw cleaner has been patented by Mr. Benjamin R. Eaton, of Middle Settlement, Ark. A shaft or mandrel is arranged to carry a series of disks to run some distance into the spaces between the saws; the disks have toothed margins as well as toothed edges, and the disks may alternately be brought into contact with one side and another of the saws.

A universal clock has been patented by Mr. Abraham M. Cory, of New Providence, N. J. It has a rotating dial annulus, surrounded by a fixed ring divided into degrees, so the time on each and every meridian will be shown at the same time; it has also additional disks to correspond with certain degrees, on which the names of places are printed on the same degree.

A secondary battery has been patented by Mr. Desmond G. Fitzgerald, of Brixton, County of Surrey, England. The invention consists in the manufacture of electrodes that are practically indestructible, by the use of suitable impervious and insulating material with which the electrode is in part coated, the internal resistance of the battery being not materially augmented if the protection be confined to the anode.

An ice machine has been patented by Mr. John Patten, of New York city. This invention relates to that class of ice machines in which cold is produced by vaporizing water by means of a vacuum maintained by removing the vapor as rapidly as it is formed, and it provides new and improved means for freezing a block of ice. The machine is so constructed that a layer of water is spread or distributed on a surface exposed to a partial vacuum, whereby water will be congealed, and although various ways of making it are provided for, the principle is always the same.

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.

For Sale.—Patent Self-ventilating Funnel. Best thing out for making money. G. M. Wickliffe, Brook Neal, Va.

For Sale.—A surveyor's transit, a level, a large microscope, an aneroid barometer, and a protractor. Each the very best of its kind. Box 113, Charlottesville, Va.

Stephen's Vises. Special size for amateurs. See p. 13.

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Curtis Pressure Regulator and Steam Trap. See p. 12.

Munson's Improved Portable Mills, Utica, N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 14.

Woodworking Machinery. Rollstone Mach. Co. Adv. p. 13.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 296.

Drop Forgings. Billings & Spencer Co., Hartford, Conn.

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The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa. can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

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Renshaw's Ratchet Drills. No. 1, \$10; No. 3, \$15. Cash with order. Pratt & Whitney Co., Hartford, Conn.

NEW BOOKS AND PUBLICATIONS.

THE ACT AUTHORIZING THE FORMATION OF CORPORATIONS. L. K. Strouse & Co., New York.

Walter J. Poor has compiled a convenient little hand book, giving the act under which corporations are formed for manufacturing, mining, mechanical, and chemical purposes, with notes and forms for establishing such corporations. The duty of receiver and his responsibility for the faithful discharge of his office is also included in this pamphlet.

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) W. F. asks how to transfer the ink from newspapers on to glass. A. The following is used to transfer engravings on to glass, and we think may be applied in the manner you desire. First, coat the glass with dammar varnish or else with Canada balsam, and let it dry until it is very sticky, which takes half a day or more. The picture to be transferred should be well soaked in soft water and carefully laid upon the prepared glass and pressed upon it, so that no air bubbles or drops of water are seen underneath. This should dry a whole day before it is touched; then with wetted fingers begin to rub off the paper at the back. If this be skillfully done almost the whole of the paper can be removed, leaving simply the ink upon the varnish. When the paper has been removed, another coat of varnish will serve to make the whole more transparent.

(2) G. J. R. asks a preparation to use for attaching a label to greasy tin. In filling cans with various kinds of oil the surface oftentimes becomes greasy, and something is wanted that will adhere to the tin on simply wiping off the oil. A. Use a dilute solution (1 to 20) of white gelatin or isinglass, or else a starch paste with which a little Venice turpentine has been incorporated while warm.

(3) C. B. wants a formula for making a coating for peanut candy to protect it from dampness. A. Try gum arabic and water, or a solution of gelatine and water of quite thick consistency. A coating of this would probably prevent any moisture from being absorbed after the candies were dried.

(4) H. C. says: I have a barrel churn 24 inches long and 22 inches diameter at the ends, and 24 inches in the middle. It is usually filled two-thirds full of cream for churning, and is turned about 55 revolutions per minute by hand, end over end. Can you determine from the above data about the power required to run it, and whether it would be practicable to use an electric motor to run it with? I mean a motor propelled by batteries. If so, about how many cells would I want? A. We should say that about one-quarter horse power would be required, and although it would be possible to use an electric motor, a dynamo machine would be necessary, and to run this latter, unless you had steam power, the plant would be so expensive that after all it would not pay you to attempt it. Batteries would be impracticable.

(5) R. B. B. asks how to prepare the enamel used on brass signs with black letters. A. A mixture of lamp black, oil, and patent drier is applied or filled into the spaces cut out in the brass; after being allowed to dry it is polished, and by continual polishing, in time, it assumes an enamel like appearance. Black baking japan is likewise used in many instances with brass signs.

(6) S. D. V. L. asks for a receipt to make salad dressing. A. Marion Harland gives the following: 2 hard boiled eggs, 2 teaspoonfuls salad oil, half a teaspoonful salt, 1 teaspoonful white sugar, half a teaspoonful made mustard, 1 teaspoonful pepper, 4 table-spoonfuls vinegar. Rub the yolks to a powder, add sugar, pepper, salt, mustard, and oil. Let it stand five minutes, and beat in the vinegar.

(7) C. H. K. asks: 1. What is the finish that is put on iron called "Tucker bronze," and how is it applied? A. Do not know of a Tucker bronze finish. Think it must be a local name. 2. What is the composition of genuine bronze, such as is used in manufacturing small ornamental hardware? A. Bronze for medals and ornaments:

Copper.....	89 parts.
Tin.....	8 parts.
Zinc.....	3 parts.
Another:	
Copper.....	82 parts.
Tin.....	3 parts.
Zinc.....	18 parts.
Lead.....	2 parts.

(8) J. E. G. says: A mechanic of my acquaintance uses a liquid glue which he says will keep for six or eight months and improves with age, can be spread on a joint and not clamped for an hour after, yet it will set in a reasonable time and make an excellent job. As he will neither sell nor give away the recipe, can you give one as good? A. Liquid glue may be prepared as follows: Take a wide mouthed bottle and dissolve in it 8 ounces best glue in half a pint of water, by setting it in a vessel of water and heating until dissolved. Then add slowly 2½ ounces strong nitric acid 36° Baume, stirring all the while. Effervescence takes place under generation of nitrous gas. When all the acid has been added, the liquid is allowed to cool. Keep it well corked, and it will be ready for use at any moment. This preparation does not gelatinize nor undergo putrefaction or fermentation.

(9) W. I. T. asks for a process of hardening gelatine so as not to render it brittle, but to be of about the consistency of tissue paper. A. The hardening of gelatine is brought about by adding potassium

or ammonium bichromate and exposing the film to sunlight. The addition of glue and tannic acid will also produce a similar effect. The exact proportions to use are kept secret by the various owners of photo engraving processes, whose value depends upon the proper manipulation of the ingredients.

(10) H. V. asks how much salicylic acid to put in a barrel of paste so it will not sour or mould, or could anything else be used that will not stain or discolor and that would come cheaper? A. One part in 1,000 to 2,000 is the proper quantity to be used in order to prevent decomposition. Carbolic acid is an equally good preservative for your purpose, and is less expensive.

(11) W. A. asks (1) if salicylic acid is of any practical value for keeping eggs in quantities. A. It is generally stated that eggs plunged for one hour in a solution of salicylic acid, and in no manner treated otherwise, will be found perfectly fresh after three months. 2. What is salicylic acid? A. Salicylic acid is prepared by heating sodium phenate in a stream of carbon dioxide, phenol distilling over, while disodium salicylate remains behind. By decomposing the latter free salicylic acid is obtained. Both carbolic acid and salicylic acid are derivatives of coal tar, and the salicylic acid may be derived from crude carbolic acid. For the treatment of eggs, see the articles in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 317, or 101 and 308.

(12) C. C. C. writes: I want to make a canvas canoe thoroughly waterproof by using some form of India rubber. How can I obtain the rubber and how dissolve it? A. The cement which you require is made by fusing together equal parts of pitch and gutta percha, and to this there should be added about two parts of linseed oil containing five parts of litharge. The heat must be continued until the ingredients are uniformly commingled. It is to be applied warm.

(13) M. E. H. writes: I have several old broken and cracked meerscham pipes. Is there any way that I can dissolve them to a moulding consistency? A. It is impossible to dissolve meerscham and then mould it. Egg cement prepared by taking some white of eggs with as much water, beating them well together, and sprinkling in sufficient lime (slaked) to make the whole up to the consistency of thin paste, is sometimes used to mend broken pipes. This cement sets or becomes hard very quickly, and can be used at once.

(14) J. W. D. asks: Is there any way for closing a crack in a meerscham pipe? And is there any way for taking the color out of them? A. See answer to above. We are informed that it is impossible to completely remove the coloring from pipes. Partial methods are kept as trade secrets by prominent makers of pipes, which they refuse to communicate.

(15) J. E. B. asks for a formula for making a waterproof covering for mirrors. A. Try pouring over the plate a varnish composed of gum dammar 20 parts, asphalt or bitumen 5 parts, gutta percha 5 parts, and benzine 70 parts. This varnish will set hard on the glass, and once dry we do not think that it will be affected by water.

(16) A. D. asks: Does magnetizing a watch destroy the vitality or strength of the steel springs and wheels so that they are easily broken? A. No; only interferes with its regularity and sometimes stops its running, because its parts that are of steel, particularly those that are hardened, such as pivots, springs, etc., become magnets, and by their attraction stop the action of the lever.

(17) F. & M. Dept. writes: Please say in your correspondent column whether scarf welded or butt welded links are strongest, and which is used for ship chains. A. Scarf weld is best. Butt weld is liable to part unless carefully done. Machine made ship chains are butt welded; hand made are scarf welded.

(18) W. L. B. asks how to tin malleable iron castings. A. The great secret is to make the castings chemically clean. This is done by means of a pickle, either of sulphuric and nitric acid in equal quantities by measure, with water in quantity to equal the acids—1 sulphuric acid, 1 nitric acid, 2 water. Dip the clean castings into a bath of melted tin covered with a coating of powdered charcoal and tallow. Drawing them through the charcoal and tallow, after thorough heating, will show them effectually coated.

(19) J. C. S. asks: Can you give me a formula for brass lacquer? A. The best uncolored lacquer is shellac dissolved in alcohol. Better make a saturated solution and then thin as you desire. Use the best white lac and 90 per cent alcohol. Add color if you desire, but it is better without. Dry in shade.

(20) W. S. C. asks how to set a steam valve on a common single slide valve engine to work the steam expansively. A. You can only work steam expansively with a common slide valve by having a good lap to the valve, and even then you cannot cut off short of ½ to ¾ the stroke advantageously. When the valve is properly made, the setting of it would be the same as any ordinary slide valve.

(21) D. T., Jr., who as a practical druggist, has made "almost tons" of fly paper, amends our recent answer to W. H. on this subject by suggesting the use of resin, boiled with enough raw linseed oil to make it very stringy; some add a small quantity of honey, but this is open to the objection that it draws so many flies as to materially increase the number to be got rid of.

(22) H. G. V. asks: 1. Is there any possibility of fire from steam pipes in a dry house for seasoning lumber, the pipes laid on wood? A. Many fires have been attributed to the contact of steam pipes with wood, but the pipes are never hot enough to cause a fire directly; steam pipes in contact with some soft woods, however, char them, and this charcoal, under certain conditions of limited supply of air, causes spontaneous combustion. 2. Is it necessary to have ventilation to increase the drying process? A. A little ventilation is best in a drying room for lumber. 3. What is the usual time for drying inch lumber at a temperature of 200 degrees, continuous day and night? A. It depends on kind and condition of the lumber; from two to four days.