RECENTLY PATENTED INVENTIONS.

Railway Appliances.

FISH PLATE.—Thomas A. Davies, New York City. The object of this invention is to provide a frictionless and rigidly attached plate, in which all the wear will be sustained by keys interposing the plate and flange of the rail, which keys may be readily detached and replaced, the plate being capable of expeditious and convenient attachment to or detachment from a rail. The same inventor has likewise obtained another patent on fish plates, in which the construction is simple and economical, the plates being combined with an inserted table and wedge, whereby they will be effectually held in essentially rigid contact with the rail, both laterally and vertically.

SECURING RAILS TO SLEEPERS.—Karl Louis Gocht, Chemnitz, Saxony, Germany. Combined with a rail and an inverted U-shaped sleeper, having an opening in its top, is a chair projecting through the opening from beneath, together with a frame beneath the rail, and means for locking the frame to the chair, the device dispensing with the use of bolts, spikes, and wedges, as with ordinary wooden sleepers.

NUT LOCK FOR RAIL JOINTS.—George C. Illingworth, Raritan, N. J. This is a device especially adapted for use with railroad rails, and which, when applied to the joints, will not be loosened by the vibration of the rail, and will also provide against the spreading of the rails, while obviating the necessity of tightening the lock nuts daily.

CAR COUPLING.—James A. Morse, Fort Bowie, Arizona Ter. In this coupling a standard is attached to the drawhead provided with a friction roller engaging with the pin, while a lever arm is pivoted at one end in the upper front surface of the drawhead, and there is a link connection between the upper end of the pin and the lower extremity of the arm, the device being designed to work automatically.

Mechanical.

FEED WATER COCK.—Henry D. Medrick, Port Jervis, N. Y. This a cock specially adapted to receive water in its passage from the tank to the boiler, whereby the water will be effectively strained, and the sediment automatically washed out by the water supply.

MOTOR.—William R. Bell, New York City. A sleeve or shaft to be driven is formed with recesses in which are mounted pawls, rings with internal ratchets being arranged to be engaged by the pawls, while bands are connected to the rings and to a pawl, the object being to provide a simple motor for light running machines, such as sewing machines, etc.

ADJUSTMENT OF SHAFTS.—Benjamin A. Dobson, Bolton, Lancaster County, England. This invention is for enabling the accuracy of the adjustment and the concentricity of the main cylinder and its shaft in carding machines to be readily tested and determined, in compensating adjustments for wear.

Electrical.

ELECTRIC MOTOR.—Frederick Yeiser, Tampa, Fla. A shaft is journaled eccentrically in a series of coils, and a series of armatures arranged around a cylinder at equidistant points, a corresponding series of circuit-operating cams being carried by the shaft, while circuit making and breaking levers are adapted to be operated by the cams, the object being to construct a simple motor in which the power will be developed by the oblique approach of the armature to the center of the helix.

Miscellaneous.

COAL CONVEYER.—Gustavus L. Stuebner, Long Island City, N. Y. This invention relates to a conveyer for depositing coal in bins, so that wagons and carts may be loaded from a trap at the bottom of the bins, a series of buckets or receptacles being supported on a track and adapted to be moved beneath a hopper or spout and over the bins, automatically depositing their contents in the bins.

BURGLAR ALARM.—Neil McIntyre, Brooklyn, N. Y. This is a device to be screwed on the inner face of a door or window, and has a piston rod to be drawn out to a contact with the edge of the door, with an arm held between the door jamb and its contiguous edge, a cap being so placed that on the opening of the door or window a spring will be released to explode the cap.

LAST BLOCK FASTENER.—William Cook, New York City. Combined with a last body is a last block having a longitudinal slot and a countersink at the outer end of the slot, a flattened head being held to the last body by a fixed nail or screw, the head being adapted to be turned independently of the nail or screw to bring it wholly within the longitudial slot of the last block, or transversely thereto, the invention being an improvement on a former patented invention of the same inventor.

SHOE VARNISH BOTTLE.—John Hoerle, Brooklyn, N. Y. This botttle has a neck with lateral apertures to receive the ends of the thumb and forefinger, and a transversely compressible tube located in the neck, combined with a stopper having a wire to which is attached a sponge, whereby superabundance of the liquid may be squeezed out of the sponge as it is being withdrawn from the bottle.

SAFETY BURNER.—Joseph Mason, New York City. This device provides for the automatic shutting off of the supply should the gas go out or be blown out, and consists of an attachment having a gas passage in which there is a valve controlled by a spring and a diaphragm, the diaphragm forming one of the walls of an air chamber arranged in close proximity to the burner tip.

GAS GENERATOR.—Samuel McIlvaine, Oakwood, Ontario, Canada. This invention provides a retort having an open top and a central bottom elevation, a vertical cylinder being set on the retort and having a gas exit pipe, while a steam and oil pipe pass down through the cylinder and connect with a funnel which partly incloses the central bottom elevation, the apparatus being simple and adapted for household use.

ENGRAVING.—William S. Eaton, Sag Harbor, N. Y. This invention relates to machine engraving on metal, and consists in producing a series of engraved pattern plates, each having a fragment only of the design, but collectively forming the complete work, the plates being successively used in transferring the design to the article to be engraved.

CORSET BUSK.—Isaac Levy, Newport, R. I. This busk is formed of a number of wires connected together to constitute a light, stiff busk, which will be flexible laterally as well as longitudinally to adapt it to the movements of the body, and to take the place of other forms of busk in one piece, such as those made of flat strips of steel, whalebone, etc.

WALL PROTECTOR.—Roldin S. Robbins and Alphonzo H. Broad, Berkeley, Cal. This is a device adapted to be secured to the backs of chairs, sofas, and other pieces of furniture, and consists of a combined base plate and roller-supporting arms formed integral from a cast or stamped blank, the protector being adapted for use upon a vertical or inclined surface, in each case conforming to the line of the wall, from the globular shape of the roller.

GATE.—Cornelius C. Epp, Bradshaw, Neb. This is a gate particularly adapted for country roads, the gate swinging between from a hinge post and a latch post to a stop post, both the latter being provided with spring catches, and the gate being adapted to be operated by a rope or cord extending to some distance at the side of the road.

GRATING.—Donald McDonald, Louisville, Ky. This grating is composed of round bars of metal gained and intersecting each other, couplings covering the joint, and is especially adapted for the use of jails, in fences and other work.

BINDER.—Asa K. Owen, Lake Geneva, Wis. This is a temporary binder for holding bill and letter heads, in which the upper surface will be of the same level as the paper held by the binder, and in which the paper may be readily introduced in the binder and firmly held in the position of use.

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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.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(832) W. F. B. writes: I have worried for some time over a musical paradox, and although my communication is somewhat lengthy, I hope you will kindly shed some light on my difficulty. The conditions I am to assume will no doubt seem ludicrous, but although not practical to demonstrate, I think they are theoretically possible. It is this: We will assume we have one thousand violoncellos, all of which are tuned with absolute precision, the string on any one of them corresponding exactly in pitch with the same string on any of the others. Now, according to the principle of sympathetic vibrations, if we vibrate the note "a" on one instrument, the other nine hundred and ninety-nine will respond loudly, and with increased loudness caused by the influence of so many instruments upon each other. If we now place upon the "belly" of one of them a one pound iron weight (the instrument being in a horizontal position), and vibrate with a bow a certain note, the belly will vibrate and the weight be agitated and moved. This we can readily demonstrate with a single instrument. Now, if we had placed a similar weight on each of the one thousand, would not all have been moved by their sympathetic vibrations? If so, we have moved one thousand pounds, which represents an expenditure of energy greater than was used to cause the vibration of the first instrument, and therefore a creation of energy. A. Each weight might be moved a very little, but the total work expended in moving them would not equal that expended in vibrating the original string. Again, it is an error to assume that the multitude of instruments will cause each individual one to vibrate more loudly than the first. The effect of so many is simply to absorb and reabsorb vibrations from the first, which else would have gone through space without being caught by sympathetically tuned strings.

(833) R. B. M.—Emulsions prepared with ammonia are very sensitive. See Abney's book on photography with emulsions. Gelatino-chloride paper is referred to. It may be printed out or developed. Chrome alum is introduced in the emulsion to make the film withstand heat. The following hydroxylamine developer is recommended:

No. 1.

Pyrogallol	437 grains.
Hydroxylamine chloride	60 "
Water	12 oz.

No. 2.

Sodium sulpbite crystals	2 oz.
Sodium carbonate	4 oz.
Water	12 oz.

To develop, add one drachm of Nos. 1 and 2 to 2 oz. of water. We think the spots on the paper were due to acid silver bath.

(834) E. W. E. K. asks how the inner surface of a hollow glass sphere 12 to 18 inches diameter, such as are frequently met with in Europe, in parks and public places, used as reflecting mirrors for the surrounding objects and landscape, could be successfully covered by amalgam of tin, etc. (silvered). A. The following receipts are given for coating glass globes: *a.* Take 1/4 ounce of clean lead, and melt it with an equal weight of pure tin, then immediately add 1/4 ounce of bismuth, and carefully skim off the dross; remove the alloy from the fire, and before it grows cold add 5 ounces of mercury, and stir the whole well together, then put the fluid amalgam into a clean glass, and it is fit for use. When this amalgam is used for silvering, let it be first strained through a linen rag, then gently pour some ounces thereof into the globe intended to be silvered; the alloy should be poured into the globe by means of a paper or glass funnel reaching almost to the bottom of the globe, to prevent its splashing the sides; the globe should be turned every way very slowly, to fasten the silvering. *b.* Make an alloy of 3 ounces of lead, 2 ounces of tin, and 5 ounces of bismuth; put a portion of this alloy into the globe, and expose it to a gentle heat until the compound is melted; it melts at 197° Fah.; then by turning the globe slowly round an equal coating may be laid on, which, when cold, bardens and firmly adheres. This is one of the cheapest and most durable methods of silvering glass globes internally. For either process the globe must be very clean.

(835) Gillem, Barrie, writes: I am successful in lining underground cisterns for rain water against leakage by using Portland cement. I have tried the same plan in coating with Portland cement the walls and floors inside some cellars under dwelling houses, and cannot prevent a leakage from outside, although finished inside equal to a cistern lining. Can you or any reader of the SCIENTIFIC AMERICAN kindly explain the trouble and suggest a remedy? A. You cannot secure perfect tightness by cement alone. The floor must have a layer of asphalt or equivalent concrete either above or underneath the Portland cement concrete. If the latter is made thick enough, very little water will pass. As regards cisterns, if after they are perfectly dry you were to paint them with melted paraffin wax, it would do much to secure them, but if properly made and free from cracks, the leakage through Portland cement mortar properly backed should be imperceptible.

(836) H. P. S. asks (1) for the simplest way to obtain oxygen gas. A. Ignite in a retort a mixture of one-sixth part binoxide of manganese with three parts chlorate of potash. 2. How to keep it. A. Do not keep it, but make it on the same day it is to be used. You can collect it in India rubber bags or in a gas holder. 3. How to direct a stream of the gas through a spirit lamp on to a ball of quicklime. A. Expel it through a fine one-sixteenth inch nozzle from the bags or gas holder by placing weights thereon, and hold the nozzle just outside of the margin of the flame. It will act as a blowpipe. You can procure from the dealers apparatus for making the gas as you use it, and properly constructed alcohol burners, etc.

(837) "Mere Sham" asks (1) for a good method of coloring meerschaum pipes. A. Smoking tobacco in the pipe is the best method of coloring. They can be stained by wood-staining processes, but unsatisfactorily. 2. How to boil one. A. They are boiled by immersion in hot beeswax. It should be done by a qualified person.

(838) W. P. asks (1) how to soften paint brushes which have become hardened by paint drying on them. A. Soak in turpentine or benzine and renew the fluid occasionally. 2. How may they be kept soft when not using? A. Wash out thoroughly with turpentine or benzine after using, or if this is objectionable keep them in water. This will exclude oxygen or air, without which oil paint cannot dry.

(839) F. E. H. asks (1) for a receipt for making gunpowder. A. Pulverize separately nitrate of potash 75 parts, sulphur 10 parts, charcoal 15 parts, all by weight. Mix them with water and continue the pulverization for a long time, keeping it moist. Then roll out into thin cylinders and allow it to dry, when you may break it up into grains. 2. Also if saltpeter and niter are the same? A. Yes.

(840) N. M. asks if there is any case on record of spontaneous combustion under any circumstances in cotton waste or rags wet with kerosene oil. A. We know of no such case, and doubt its probability. Were such a case reported, we should suspect the presence of some other oil or fatty substance.

(841) J. Q.—The sample of water is probably charged with sulphate of iron from decomposition of iron deposits. We doubt if it has any value.

(842) W. H. S. asks: What chemicals, if any, mixed with water will produce a combustion or evolve gas if heated? A. Sodium in warm water will float on the surface, evolve hydrogen gas, and will catch fire and burn on the surface. It is very dangerous, generally exploding toward the close of the operation. Magnesium decomposes hot water, with evolution of

hydrogen gas. Zinc dust in the presence of water and acid will sometimes ignite. If caustic soda or lime and water are boiled with phosphorus, phosphureted hydrogen gas is evolved, which spontaneously catches fire as each bubble escapes into the air.

(843) J. B. K.—The sample sent is crude bitumen or asphaltic deposit. It might have some value for gas making, tar roofing, or analogous uses.

(844) F. W. J. asks: 1. Is not the zinc in the Bunsen battery amalgamated? A. Yes. 2. Is the light, using a Bunsen battery, produced by heating platinum wire, or between two carbon points? A. You can make a light by heating the platinum wire by means of the current. As the platinum gives the best light when on the verge of fusion, there is great danger of fusing the wire, and it has been found impracticable to use it for this purpose. Carbon filaments are now used for incandescent lamps. With a sufficient number of cells you can produce an arc light between two carbon points. 3. What amount of gas, burning, would a sixteen candle power electric light equal? A. A 4 or 5 foot burner. 4. What would be a good design for a scarf pin, using a pocket battery, and would a silver quarter or half piece do for the silver or negative plate, and how large should the cell be to receive the carbon, silver, and solution? A. We cannot in the space at our disposal give you the information required. Consult Hospitalier's "Domestic Electricity." 5. Would it be cheaper to make the dynamo described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, or buy or make batteries, to produce light? I only wish to have one or two lamps. A. Probably the batteries would involve the smaller expense. You can buy the dynamo referred to for $50. If you have plenty of spare time it would be cheaper for you to make the dynamo than to buy it. 6. Which would be the cheapest for a motor, an electric motor or a water motor? A. The water motor, providing the water required to run it is not too expensive.

(845) S. K. L. asks: 1. Are type-written documents as permanently legible as those written with the inks commonly employed for pen work? A. If carbon ink is used they are more permanent than ordinary writing. If aniline inks are used they gradually fade. Carbon paper used for multiple type-written copies is often made with logwood extract and an iron salt, in which case the copy is liable to fade, but could be renewed by treatment with nutgalls solution. But a true carbon or lampblack ink is absolutely permanent. 2. If not so permanent, will you state, in a general way, how long such documents will remain legible when filed away? A. No time can be assigned. It may be several years. Much depends on the darkness of the place of deposit. 3. In the event of the ink fading, is there any method by which the writing can be restored? A. This is indicated in the first answer. For an aniline ink, nothing satisfactory can be done; for a spurious carbon ink, treatment with nutgalls may restore the writing. A true lampblack ink, such as printers use, should be employed for important work.

(846) C. B. J. asks: 1. How many pounds anthracite coal does it require to maintain steam of one horse power per hour? A. 1½ to 5 pounds, according to the economy of boiler and engine. 2. How many pounds bituminous? A. Bituminous and anthracite coal are very nearly equal for equal qualities. They both vary from 7 to 10 pounds of water evaporated per pound of coal from a temperature of 212°. 3. How many thousand feet of natural gas are equal in heat-creating power to one ton anthracite coal? A. About 40,000 cubic feet. See "American Steam Engineer" by Edwards, for table of values for various kinds of anthracite and bituminous coals and steam engine practice. We can mail it for $2.50.

(847) A. W. H. asks (1) how to hone a hollow ground razor, and keep it in good cutting order. A. You cannot make a poor razor keep its edge. Proper stropping each time is the only way to keep it in cutting order. Honing should be the exception, only done when the edge gets thick from stropping. 2. How to measure the pitch of a screw propeller wheel. A. To get the pitch of the screw, take the angle of the outer edge of the blade with the shaft axis. Multiply the diameter by 3,141 and lay this off in some convenient scale, say 1 inch to 1 foot, and raise a perpendicular line to represent the shaft axis. From the distance of the measurement of the circumference draw a diagonal line at the angle found on the blade. The perpendicular distance of intersection is the pitch.

(848) A. G. L. writes: I have a fine flute the ivory head of which is cracked its full length, leaving an opening of about one-fiftieth of an inch, which I desire to mend so as to be as nearly invisible as possible. Can I cement it together, and if so, what cement should be used, or must the crack be filled? What substance could be used for filling which would not discolor and would resemble the ivory? A. The flute head is supposed to be lined with a brass tube. The shrinkage of the ivory has caused the crack. You cannot close the crack nor cement it in a satisfactory manner. It may be filled with chalk made into a putty with mucilage or white glue. Magnesia and zinc white also makes a good putty for ivory cracks. Use as little mucilage or glue as possible in the putty.

(849) E. H. C.—The lenses of large telescopes should never be exposed to gather dust or moisture when not in use. The fouling of the surface while in use is very gradual, and should not be removed until found necessary by the thickening of the image of a star, when a soft clean linen handkerchief will readily remove the film by first breathing upon the glass and quickly and lightly wiping. No polishing material of any kind should ever be used by any but an expert or the maker.

(850) T. McC.—Pearl shell for inlaying should be sawed into pieces of the proper size for use, when the back can be split off or ground off on a stone, or the shell can be fastened to a block and the outside cut off with a sharp hard chisel and mallet.

(851) T. G. B.—1. The sandstone drillings are a very pure quartz. 2. The fossil is a shark's tooth. 3. The other sample is probably a quartzite or flint rock.

(852) A. C. S. asks: 1. Is it the electric arc or combustion of the heated ends that destroys carbons used in arc lamps? A. It is principally combustion of the carbon. 2. Can the electric arc be established between two diamonds? If so, how will they be affected by the arc? A. Diamonds are burned and vaporized in the electric arc. They will not act as arc electrodes because they are very poor conductors.

(853) G. E. asks: Which will deposit the most copper within a given time, a current of 10 amperes and 4 volts pressure or a current of 4 amperes with 4 volts pressure? A. The 10 ampere current will deposit most copper.

(854) E. D. P. asks if there is a preparation that can be put into stumps to keep them from sprouting and cause them to decay quickly. A. Bore a hole in the top and pour in a little nitric acid.

(855) N. L. R.—We do not advise you to equip a birch canoe with power. Boat propulsion by voltaic battery is not yet a success. Storage batteries have done fairly, but require an electric plant for renewal, which is not always convenient. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 430, 563, 623, 674.

(856) J. W. V. asks the best style of burners for melting steel in crucibles, and which makes the hottest fire, compressed air and oil, or steam and oil? A. The combined steam, oil, and air jet seems by late experiments to give the best results. You will find petroleum burners illustrated in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 623, 624, 592.

(857) H. J. B. writes: I wish to lay a water pipe from a spring a distance off. Will it be necessary to start with a large pipe at the head and taper smaller at other end, or will pipe the same size do all of the way? A. Lay one sized pipe the whole distance, unless there is a high head, say 100 feet, when economical practice suggests a larger pipe for the upper portion.

NEW BOOKS AND PUBLICATIONS.

GERTRUDE'S MARRIAGE. By W. Heimburg, translated by Mrs. J. W. Davis, of Cambridge, Mass., with photogravure illustrations by W. DeMeza. 1 vol. 12mo, cloth extra. Price $1.25. Same in paper, 75 cents. Worthington & Co., publishers.

This admirable translation has so much that appeals to our American fancies that it does not seem like a foreign production in its form or texture. It is a pretty story and possesses at times real dramatic fire.

TO INVENTORS.

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