ENGINEERING INVENTIONS.

A stock car has been patented by Mr. Henry Hess, of Canfield, Ohio. The floor of the car can be so adjusted that the animals cannot lie down, thus preventing the stronger from trampling on the weaker, and the car platform can easily be arranged for use as an ordinary cattle or freight car.

A compound to prevent the fusion of cinder has been patented by Mr. Wesley Case, of Topeka, Kansas. It consists of bicarbonate of ammonia, saltpeter, bicarbonate of soda, resin, and other ingredients mixed and used after a designated manner, to prevent the formation of clinker in the combustion of coal.

A car coupling has been patented by Mr. Charles Uebinger, of St. James, Ind. In combination with a drawhead is a spring bar beneath, with a beveled block secured to the free end of the spring and in front of the drawhead, whereby the coupling links of high and low drawheads may be guided within said drawheads.

A car coupling has been patented by Mr. Joseph F. Fairfield, of Alma, Neb. The coupling is formed of a forked drawhead, in the outer end of which a coupling pin is pivoted, the inner end of the sliding bar being connected with the locking frame on the drawhead, and the locking frame connected with a bar projecting upon the side of the drawhead, the coupling being done automatically and so the cars can be readily uncoupled.

An electric block signal for railways has been patented by Messrs. Stephen J. Swayze and John C. Lane, of Sag Harbor, N. Y. This invention covers improvements on former patents issued to same inventors, including electric locking arrangement for locking the signal until the train that set it reaches the next signal station, when the signal board of the signal next in rear will be released, indicating that the track is clear between it and the first signal ahead.

A steam trap has been patented by Mr. Robert B. Morse, of Naugatuck, Conn. This invention covers a simple and easily applied device more particularly designed for steam heating apparatus, and consists of a circular or disk valve on an axial stem at right angles to the length of a steam pipe, with such connections that, as the steam pipe expands and contracts by heat and cold, the valve will turn for opening and closing the ports for the escape of water condensing in the trap.

MECHANICAL INVENTIONS.

An oil cup has been patented by Mr. William A. Foster, of Fitchburg, Mass. This invention relates to oil cups where an adjustable valve spindle regulates the flow, and covers an attachment for holding the spindle, so it may be set for any desired rate of feed, and readily changed to a close or open feed.

A process of fastening diamonds in tools has been patented by Mr. Thomas W. Collins, of New York city. The fastening is obtained by means of metal deposited by electricity around the diamond and the adjoining parts of the tool, thus fastening diamonds firmly to the edges and surfaces of abrading and cutting tools, as stone saws, rock drills, etc.

An insertible saw tooth has been patented by Mr. William B. Risdon, of Trenton, N. J. This invention covers a peculiar construction and arrangement by which insertible saw teeth can be used in places where it is desirable to remove and replace the bits or teeth without taking the saw from the mandrel, or removing the holding spring from its seat.

A pulley belter has been patented by Mr. James N. Wilson, of Higginsville, Mo. This is a novel adjustable clamp device to clamp on a driving pulley across the face, and for running the belt on the pulley, it being especially designed for use on thrashing machines, where belts are apt to run off from being long and crooked and run at high speed.

A means for transmitting motion has been patented by Mr. Walter A. Rollins, of Wyattville, Surrey, England. Combined with a shaft having ratchet teeth on its end is a tubular bar, into which the end of the shaft projects on the other part of the machinery, with other devices, whereby motion may be transmitted in one direction in such manner that the parts can revolve independently in the reverse direction.

Improved machinery for rolling wire has been patented by Mr. William H. Jackson, Jr., of Trenton, N. J. The wire is passed through a series of rollers, and through one or more intervening furnaces, the speed of the rollers being easily regulated in such manner that it can be rolled down to a diameter of about one-eighth of an inch, instead of having to be drawn down for such sizes, as heretofore.

A pressure feeder for pulp grinders has been patented by Mr. Edward F. Millard, of Marinette, Wis. A steam or water pressure feeder or presser is contrived to so feed the wood to pulp grinding stones that the piston will be withdrawn by suction or a vacuum when the blocks are ground up, and thus avoid the use of packing, and save the cost of keeping the packing in order.

A brick machine has been patented by Mr. William S. Smith, of Dayton, O. The machine has a wheel with mould openings, a cam driven pawl for revolving the mould wheel intermittently, and plungers worked by cam driven levers, so the bricks will be made and discharged automatically, thus facilitating the manufacture of pressed bricks, and simplifying the construction of machines.

MISCELLANEOUS INVENTIONS.

An ear ornament fastener has been patented by Mr. George Krementz, of Newark, N. J. The invention covers a nut fitting on an ear wire, for holding an ear ornament, with means for clamping the nut on the wire.

A bib for children has been patented by Mr. George E. Kimball, of Franklin, Mass. The bib has on its front a pocket for a nursing bottle, so the clothes will be protected, the bottle held conveniently, and the contents not apt to be spilled nor the bottle broken.

An anchor has been patented by Mr. William Lewis, of St. John, New Brunswick, Canada. This invention covers a peculiar design for an improved anchor, one which is calculated to be simple in construction, not easily fouled, and which will readily take hold on the ground.

A harness saddle has been patented by Mr. Daniel B. Holsburg, of Granville, Ill. This invention, by a novel construction and arrangement of parts, provides to so support the thills that they will not make any side to side motion of the pad, to chafe or gall the horse's back.

An incubator has been patented by Mr. James Rankin, of South Easton, Mass. Improved means are provided whereby the water employed to maintain the required heat is also made to regulate the temperature, and maintain it automatically at a uniform degree.

A necktie fastener has been patented by Mr. Frederick Kubec, of Riverside, Iowa. It is made of two pieces of spring wire, to which the material of the necktie is stitched, the wire being so shaped as to readily hold the necktie in position without being attached to the collar button.

An eaves trough hanger has been patented by Mr. Henry J. Hoepfner, of Athens, O. The hanger is formed of a metal strap, with ends secured to a cross piece in one continuous piece of wire, which is provided with loops through which the nails or screws for fastening the hanging wire to the roof can be passed.

A thill coupling has been patented by Mr. Milton E. Campany, of Muskegon, Mich. This invention covers a peculiar construction and arrangement of parts whereby the clip is so held on the axle that rattling is prevented, and coupling and uncoupling are quickly and easily effected.

A stay roller for sliding doors has been patented by Mr. Le Grand Terry, of Horseheads, N. Y. This invention covers an improved arrangement for guiding the bottom of a sliding door, the roller being held sufficiently firm to prevent rattling, while it is permitted to revolve freely, and without undue friction.

A pneumatic lock has been patented by Mr. Alonzo W. Fuller, of Boston, Mass. In a lock with two piston cylinders, connected at their opposite ends to a bolt mechanism, is a third cylinder with an air compressing piston, connected with and operating the other cylinders and bolt by a suitable valve mechanism.

A ship windlass has been patented by Mr. Ambrose Amiro, of Pubinco, Nova Scotia, Canada. The arrangement of the brake lever and ratchet wheels is such that the brake lever ranges parallel with the drum of the windlass compactly, and affords a simple means of applying great power to the working of the windlass.

A metallic barrel hoop has been patented by Mr. Ellsworth Ford, of Westville, Conn. This invention consists of a half round metal hoop blank twisted at its opposite ends in reverse directions to engage and hold the ends firmly together, and with a rib adapted to bed itself in the wood and hold the hoop in place without nails.

A border light for theaters has been patented by Mr. John T. Preddey, of Carson, Nevada. The invention covers a cylindrical casing, with an open offset in the top, in front of which is a reflector, and in front of the reflector the casing has a hinged wire netting part or door, making a light which is safe, simple in construction, clean, and durable.

An oil cup has been patented by Mr. William H. Thomas, of Santa Ana, Cal. The patent covers such construction as will afford facility in filling the cup, free from liability to loss of filling plug or stopper, a positive lock for means for adjusting the feed, and the oil is caused to drop direct from the point of the feeder.

An improved horse power device has been patented by Mr. Homer Adkins, of Concordia, Kansas. A balanced tipping or tilting horizontal driving wheel is provided, with its whole support below, and means for tipping or tilting the same and making it run steady, lightness being combined with strength, and an easy and steady motion obtained with but little friction.

A bench dog has been patented by Mr. Riley Doty, of Leonardsburg, Ohio. It consists of a channel bar of steel of differently shaped cross section, notched transversely near the upper end to form teeth for engaging the work, and inserted in the bench at a slight inclination from the vertical, being capable of holding work firmly either flat or edgewise.

A bag holder has been patented by Mr. Herbert R. Royston, of Chicago, Ill. This is a simple contrivance of a base piece for attaching to the wall, counter, or other support, with an elastic band stretched between two points of the piece, between which band and base the package of bags is to be placed for being held so as to be pulled out one at a time as wanted for use.

A bung borer has been patented by Mr. Gustav A. Stanger, of Chester, Conn. It consists of a tapering casting with a longitudinal slot, on one edge of which is held a blade, a bottom plate on the lower end of the casting having an aperture forming a cutting end, and with a gimlet pointed screw, making a borer that catches the chips and prevents their dropping into the barrel.

A wire stretcher has been patented by Messrs. Charles S. Older and Leander L. Deering, of Independence, Iowa. Combined with a gripping device and gravity clutches is a lever, and a looped bolt forming the pivot of the lever, and with its loop adapted to receive the bar upon which the gravity clutches are arranged, so the wire is drawn up every time the lever is moved in either direction.

A cider mill has been patented by Mr. Alpheus D. Lair, of Mexico, Ind. It has two endless fabric bands passed over suitable rollers, one of which receives the pomace from the grinding mill and carries it over rollers, above which is a presser plate, the pomace afterward being carried between presser rollers, the pomace and cider being automatically separated, and the mill operating very rapidly.

A marking and shading pen has been patented by Mr. Elbert Alderman, of Portville N. Y. The working end or shading piece is made of India rubber, and by suitably holding or turning the pen in the hand it will make marks of required width for coarse or fine shading, having a steady feed and being much easier used than a brush, while making a smoother mark.

A music holder has been patented by Mr. George Burt, of Fort Madison, Iowa. The body of the holder is made of sheet metal, cut and stamped into any ornamental form, and bent at its lower end into two ears, a spring actuated clamp with slots being pivoted thereto, with spring fingers, and other peculiarities of construction, for holding music on a drum or other band instrument when marching or otherwise.

A fire alarm has been patented by Mr. Charles H. Judson, of Greenville, S. C. In combination with a wire having highly fusible connections is a spring connected with a mechanical bell ringing mechanism, several lines of wire from different parts of a house being so arranged that the melting of any one of them will give the alarm, and record the place of fire on an annunciator in the office or elsewhere.

A bailer for cleaning oil wells has been patented by Mr. James S. Moody, of Summit City, Pa. The bailer consists of a tube with a check valve at its lower end, and a steel neck and valve closing upwardly at its upper end, with a stem connected with the drill line, so a sand line is unnecessary, the gas is allowed to escape, and the bailer can be entirely filled before it is drawn out, so the well can be cleaned more rapidly and thoroughly than at present.

A simple and cheap device to lower the draught on platform wagons has been patented by Mr. Foster H. Cheney, of St. Louis, Mo. There is a broad inner and outer clevis swung from the gear at desired height or place by springs, which relieve any jerk, and permit draught strain to come on chains attached to the axle. The evener bar is firmly clamped by the inner clevis and a flat spring bar through which the evener bolt passes, so that there is no hole to weaken the wood. There is also a detachment device to quickly release the draught animals.

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.

NEW BOOKS AND PUBLICATIONS.

DIE PHYSIKALISCHEN GRUNDSAETZE DER ELEKTRISCHEN KRAFTUEBERTRAGUNG. By Joseph Popper. A. Hartleben, Vienna.

This pamphlet of fifty-five pages is an introduction to the study of the transmission of power by electricity, enumerating the physical principles involved, together with their mathematical proofs.

CHAMBER OF COMMERCE OF NEW YORK, ANNUAL REPORT, 1883–84. By George Wilson, Secretary. Printed for the Chamber.

Mr. Wilson's many years' experience as secretary of of the Chamber, and the care and good judgment he exercises in compiling this record, not only of the proceedings of that body, but of the most important statistics of New York business, renders this volume an especially valuable one, making, as it does, a work unique in its way. The special trade reports cover nineteen leading articles of commerce in New York, all prepared by acknowledged authorities on the subjects treated of.

WORKSHOP RECEIPTS FOR MANUFACTURERS, MECHANICS, AND SCIENTIFIC AMATEURS. Third series. E. & F. N. Spon, New York and London.

The two former volumes of this series have been received with great favor. This one is largely devoted to electrical and metallurgical matters. The article "Electrics" explains a wide range of methods in the practical applications of electricity, and in this specialty, as well as in the department of metals, their alloys and different ways of working, the information given is brought down to the latest dates, and set forth in clear and concise language.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) J. A.—Transfer paper is made by rubbing thin strong tissue paper with a composition consisting of 2 ounces tallow, ½ ounce powdered black lead, ¼ pint of linseed oil, and sufficient lampblack to make it of the consistency of cream. These should be melted together and rubbed on the paper while hot. When dry, it will be fit for use.

(2) J. M. F. writes: Can I obtain through your correspondents' column some information concerning carving in clay, additional to that contained in the SCIENTIFIC AMERICAN SUPPLEMENT, for May 29, 1880, No. 230? A. Modeling clay is any clear gray clay, or if preferred, porcelain clay moistened with water and a little glycerine. The glycerine prevents drying. There is a modeling school in the Cooper Union where you may obtain both information and instruction in modeling.

(3) C. T. B. asks: 1. How much greater, if any, is the specific gravity of water in a lake or ocean at 1,000 feet below the surface than at the surface? A. The specific gravity of water at great depths is no greater than what is due to its compressibility, which is virtually *nil*. 2. Is there a point in the depths of water at which a body whose specific gravity is just a little greater than water at the surface will, if placed in that water, cease sinking before it rests on the bottom? A. We believe

that the theory that bodies of about the same specific gravity as water float at a certain depth is no longer held. 3. If a body whose specific gravity is less than water is submerged in the water of a reservoir, and is of such shape and so placed on the bottom of the reservoir that no water is beneath it or any part of it, will this body rise to the surface or remain at the bottom? A. It will stay there just as long as the pressure of the water is confined to its top and sides.

(4) D. & N. write: We have been endeavoring to construct a cheap barometer by suspending two air chambers (one open and the other sealed) from opposite ends of a balanced beam, with the expectation that the varying weight of the atmosphere filling the open one would cause them to rise and fall, and thus foretell the weather. The open one will go up on the approach of fair weather, but it will not go down on the approach of rain. Why does it not work both ways? A. The changes in temperature have too much influence upon the action of the barometer that you have made to make it a serviceable instrument for its legitimate purpose. In fact, we cannot see the value of the cylinder with the hole in it over a solid counter weight. The whole as light as possible; and balanced in all positions and varnished with shellac to prevent the effects of moisture that will gather upon the surface upon change of weather. The difficulty is probably with mechanical construction of your barometer; your theory is correct.

(5) J. H. R. writes: I have a hydraulic ram; the air chamber gets full of water upon an average of once in two weeks, and stops the ram. Now, is there any remedy for this? A. A hole one-eighth to three-sixteenths inch diameter at point above connection in drive pipe is said to remedy the trouble, or possibly there is a small leak about the air chamber.

(6) O. S. V. asks: 1. Are ports ¼ inch x 1 inch and exhaust ½x1 inch the right size for a cylinder 2½ x 5 inches? A. Better make them ⅝ x 1½ and ⅞ x 1½ inches. 2. Is a half inch pipe large enough for steam pipe for same? A. Make your steam pipe 1 inch diameter and exhaust 1½ inch diameter. 3. Is a ¾ pipe large enough for exhaust; if not, what size should it be? What power would the engine have at 300 revolutions? A. For the power refer to rule in SUPPLEMENT, No. 253. 4. What diameter and what weight should the fly wheel be? A. Wheel 18 or 20 inches diameter, and weight about 75 pounds. 5. Will a vertical boiler 16 inches in diameter and 3½ feet high furnish sufficient steam? A. No; it should be at least 20 inches diameter and 4¼ feet high. 6. Would a plunger pump ¾ inch in diameter with 1 inch stroke driven by eccentric on main shaft feed the boiler, and what size should feed pipe be? A. No; it should be 1⅛ inch diameter and 3 inches stroke at least. Make pipe ¾ inch diameter.

(7) J. A. R. writes: I have an engine of the following dimensions: Cylinder is 8x14¼, ports ⅝ x5, exhaust 1⅛ x 5; valve is 4⅝ x 6¼; travel of valve 1¾. Now, the valve will open but ⅜. Is there not too much lap? If so, shall I cut the valve down? Does the valve travel far enough? Please tell me how to fix it. A. You do not give the lap of the valve nor the width of bridge, hence we cannot say what alteration should be made, but we infer you have too much lap or too little travel, or both. 2. Steam pipe 1⅛ inch, a short piece 4 inches long from the governor to steam chest, 1¼. Boiler 36 inches by 10 feet, two 12 inch flues, 60 pounds of steam, revolutions 160; how many horse power? A. Your steam pipe should be at least 2¼ inches diameter. For horse power see rule in SUPPLEMENT, No. 253. 3. I want to run a saw 50 inches; diameter of fly wheel, 48 inches; what should the pulley on the saw shaft be to give 725 per minute? Or should I run engine faster? Pulley now is 20 inches. I think it is too large. Am I right? A. With pulley on saw shaft 20 inches the pulley on engine shaft should be 7⅛ feet diameter, or you can reduce both pulleys in proportion.

(8) Mrs. C. B. S. asks: Is not electricity visible in St. Elmo's fire, and also in the electric light in which the electric arc is *in vacuo*; or if we do not see the electricity itself, what do we see? A. It is supposed that electricity itself is invisible. Its effect on certain substances is to render them visible.

(9) H. E. D. writes: 1. I have made a pen (electric) from the directions given in SUPPLEMENT No. 166, but I can't make it perforate close enough; the spark punches a hole and then continues to go through that hole until the pen is moved a sixteenth of an inch or more, then makes another. The coil I use gives a half inch spark. A. Try less current and thinner paper. 2. How can I make a good storage battery? A. See SUPPLEMENT, Nos. 322, 301, 338, 286.

(10) B. G. W. writes: I wish to make an electric circuit to indicate when water is rising above a certain height. What terminals should I use at the water end, the idea being for the rising water to cover over the terminals and hence complete the circuit? And as the space between need be but a fraction of an inch, I suppose the resistance will be but slight, and that the wire terminals should be something that would not rust. A. Mere wire would not answer for a terminal. Use a plate of metal having an area of one or two feet, or operate a pair of metallic contacts by means of a float.

(11) J. B. G. asks how to preserve flowers so as to keep their color and brightness. Also how to preserve butterflies and other insects. A. Flowers may be preserved by immersing them in a bath of liquid paraffine. They are stirred around for a moment, so as to become completely coated with the wax. Insects and butterflies are generally preserved by placing pieces of camphor in the case in which they are kept. Sometimes insects are dipped in a strong solution of (corrosive sublimate) mercuric chloride.

(12) F. T. J. asks how calcimine is made, the different ingredients, etc. A. The process of calcimining depends largely upon the condition of the walls. If they are new, nothing further than a coat of good Paris white with just enough glue size added to bind it is required. If the work is inferior and very porous, it will require a preparation of strong size, soft soap, and a handful of plaster of Paris. Spons' Workshop Receipts, second series, devotes several pages to various receipts to be used for conditions that are likely to occur; also giving the formulas for the various colored calcimines in use.

(13) T. C. C. asks how to make heavy canvas so water tight, by painting it with some kind of oil or paint, that when anything porous is on the inside, water cannot soak through. A. Linseed oil is generally used for this purpose. See also the SCIENTIFIC AMERICAN SUPPLEMENT, No. 317, which gives descriptions of seven processes by which cloth can be made waterproof.

(14) M. S. asks: 1. What is considered to be the best speed for drills in cast iron, wrought iron, machinery steel, and tool steel? A. The speed depends upon the size of the drill and the condition of the material. The fastest speed we ever used was 1,600 revolutions for a drill of No. 18 steel wire. Machinery steel can be drilled at a higher speed than cast iron, wrought iron, or tool steel. The question cannot be answered definitely unless the size of the drill and the shape of the drill are given. 2. Does the increase twist of a drill take out the chips faster than the regular twist? A. The gain twist of a drill is an advantage in the rapid removal of chips, especially in wet work—oil or soda water. But the drill should have not only gain twist, but increased width of score to act well. 3. How much more duty does a twist drill do than the old fashioned flat drill? A. The twist drill is generally at least twice as effective as the flat drill, requiring less pressure for its work and clearing itself of chips. In some instances it will do fourfold more work than the flat drill. 4. What formula is used in designing cone pulleys so that the belt will run with equal tension on any of the corresponding steps of the cones? A. There is no definite formula. The conditions of desired diameters of largest and smallest cones and of distances of spindle cone and counter cone apart, are necessary. These being known, or at least, the distances apart being determined, lay out a scale diagram and measure the distances, which will give the length of belt. This will determine the diameters of the cones between the largest and smallest steps. It must be remembered that the "slant" or angle of a belt is different from a straight parallel line measurement.

(15) J. A. asks whether soap or ammonia would be injurious to vulcanized rubber, and also what will destroy oil or grease on vulcanized rubber without injury to the rubber itself? A. Soap would not be likely to affect the rubber; the use of ammonia would not be desirable. We would recommend you to use for the removal of the grease a weak solution of either potassium or sodium hydroxide or else ether mixed with alcohol.

(16) T. G. C. asks if slight scratches can be removed from sheet glass by any chemical. A. Ammonium hydroxide (hartshorn) will probably take the scratches off.

(17) A. R. S. asks for a receipt for making a covering or paint for a wooden aquarium, so the water will not penetrate it. A. Use a lining of melted asphaltum. A good asphaltum varnish would likewise be suitable. SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, gives receipts for cements for aquariums.

(18) E. M. asks: Is there any method to your knowledge for removing freckles from skin? A. A compound consisting of two parts sulphocarbolate of zinc, 25 parts of distilled glycerine, 25 parts of rose water, and 5 parts scented alcohol, to be applied twice daily for from half an hour to an hour and then washed off with cold water, is often used for the removal of freckles. We do not recommend such applications, however.

(19) H. M. D. asks for a receipt for a perfectly black and a bright red indelible ink for marking linen with a rubber stamp. A. For the black use 16 parts of boiled linseed oil varnish, 6 parts of the finest lamp black, and 2 to 5 parts of iron perchloride, diluted with one-eighth the quantity of boiled oil varnish; it can be used for a stamp. For color, use 1 part gelatine glue, 2 parts aniline of desired color, 1 part absolute alcohol, 10 parts glycerine, 1 part Venetian soap, ½ part salicylic acid.

(20) J. L. P. asks how he can caseharden strips of tire steel 1½ inch by ¼ inch 14 inches long. The steel is of too poor a quality to harden in the ordinary way. Can he pack say 50 strips in a box with leather, horn, or bone, heat and allow to cool gradually without opening the box until cold; then heat singly in a common forge fire, and treat the same as good cast steel in hardening? If not possible to do it by this means, what course should be followed? A. If you are making files with low steel, it is the teeth that require the most care. The plan that you have tried should accomplish the purpose with the addition of dipping the files in a saturated solution (hot) of ferrocyanide of potassium (yellow prussiate) before packing in the carbonizing material. As you say nothing about the time that you kept the work at a full red heat, we suggest that you keep up the heat longer than before; you should succeed. A few trials will give you the proper length of time for roasting.

(21) L. A. writes: A tank is full of water; the discharge pipe goes through the bottom of tank and up nearly to the top of the water, say 10 inches below the surface of the water in tank. Will the force of the discharge be increased by shortening the pipe? A. No.

(22) W. S. writes: 1. In cutting rafters, what is termed third pitch? I claim that the rafters raised one-third of the width of the building is third pitch; others say it is not. Who is right? A. One-third pitch is a rise equal to one-third the horizontal line from end to peak plumb line, or the width of the building for a single roof, or one-sixth the width of the building for a double roof. 2. If I take 8 inches on the blade of my square and 5 feet 4 inches on the tongue, will it give the bevels for a third pitch? A. Your figures in second query are not correct; 8 inches by 24 inches will be correct. 3. In drawing water from a well, over a single wheel, does a 10 inch wheel draw any harder than one 20 inches? A. A 10 inch wheel will draw no harder than a 20 inch if the axle is proportionate and in good order. 4. Is there any part or place on a locomotive drive wheel that is at rest while the locomotive is running? If so, what part? A. The part of a wheel that touches the rail is theoretically at rest with reference to the rail.

(23) E. E. P.—Common plate is unfit for lenses. Good clear French or Belgian plate, such as the large plates that are put into store fronts, if you can find a broken one or a piece at a plate glass establishment, will make a tolerably fair lens. Flats for Newtonian telescopes should be made of speculum metal. A prism is good but expensive. A lens or glass of any kind is useless for closing the end of the telescope. Use a tin cover when not in use.

(24) M. & B. ask what it is that a cow chews after having been fed. Do cattle have a "cud," or is it the food thrown back into the mouth? Do cattle ever lose their "cud"? If so, what is the remedy? A. Cattle chew their cud, which is a ball of fiber supposed to be derived from their fodder. They sometimes lose it. The remedy is an artificial cud.

(25) F. G. writes: I am a farmer. I want to build a silo of wood because of its cheapness. Expect to lay up solid walls of boards or planks 8 inches wide, and as dry as I can get. Then line this with three thicknesses of tarred paper, and finish with matched pine boards nailed on vertically. Now, the inside of these walls will rot, I fear, being so solid and air tight, and how can I prevent it? Shall I smear every board with gas tar and lime before laying? Shall I bore holes from top to bottom of the wall, and soak the whole with crude petroleum or linseed oil? What? Would any of these things flavor the ensilage, and hence the butter? A. We do not approve of wooden walls for a silo. Anything like coal tar or petroleum will give the ensilage a strong odor that is repulsive to cattle, and may flavor the products of the dairy. We do not think the proposed wooden structure and its preserving material is as cheap in the end, nor will it be as air tight as a concrete wall that can be made with hydraulic cement and gravel or small stone. A silo depends on the retention of carbonic acid gas generated by a slight fermentation for the perfect preservation of its contents from the destructive influence of the air. The gas being heavier than air settles to the bottom, filling the entire silo to the exclusion of air. Hence the necessity of making it gas tight. See Concrete Silo, in SUPPLEMENT, No. 242.

(26) W. H. asks: 1. What acids or what process to put brass through to tin or lead line the brass. A. Dip the tubes in a solution of hydrochloric acid to which zinc has been added. This solution must be rubbed in the inside of the tube; then proceed with the tinning process, for which see the article on Electrometallurgy, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 310. 2. How to mix a solution to zinc cast iron, and how to treat the castings before dipping? A. The solution as just mentioned consists of hydrochloric acid into which zinc is put. The castings are tinned, and soldered with resin.

(27) A. N. asks if all the sparrows seen in our streets are English sparrows, and if all the male birds are distinguished by the dark spot on their breasts or necks. A. All of the English sparrow stock. The males are distinguished by the dark spots.

(28) F. S. asks (1) whether there is any way of inlaying bronze or brass letters in stone except by heating process. Can it be done in a similar way to filling teeth in dentistry? A. Letters and devices cut in gems are filled with gold foil by pressure with small tools. Letters are cast and inserted in artificial stone by making the stone and inserting letters (name and address) before it sets, then finishing off the surface. Letters cut in dovetail in stone may be filled with amalgam of copper filings and mercury, which after setting may be finished with the surface of the stone. Metals may be also deposited in such cuttings by the electrotype process. 2. Is there any way of filling seams in hard wood by using fine sawdust and glue? If so, how should it be prepared to make it waterproof, as it is for a hard wood floor? A. You may fill seams in floor with sawdust and shellac varnish that will be waterproof.

(29) F. W. H.—The wire is composed of zinc, and is probably alloyed with something to harden it, such as aluminum. It is likely that it will have to be procured by special order. If we knew more of its history, perhaps we could tell more about it.

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

R. M. L.—The mineralogical name for the Arkansas oil stone is novaculite. It is found at several localities in Pulaski County, at Hot Springs (there called Ouachita oil stone) and at Whetstone Mountain. The amount found is probably small, as less than $100 worth is annually sold. The stones are prepared by grinding suitable pieces on revolving grindstones.

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