ENGINEERING INVENTIONS.

A car axle box has been patented by Mr. Joseph Fischer, of Elizabeth, N. J. Combined with a journal box is a shaft, two rotary pumps, and a pulley, the device being so operated by the revolutions of the axle as to continually feed oil upon the journal.

A car coupling has been patented by Mr. John Cuneo, of Vicksburg, Miss. It has twin arms or jaws in approximately the same plane, with cross rod extending between them in the rear of their engaging portions, and one arm having a cam or wedge block arranged and operating close to the shoulder of the jaw end of the arm, with other novel features.

A car coupling has been patented by Mr. Lewis H. Shular, of Crawfordsville, Ind. The drawbar has suitable guides, and the forward end of the drawhead rests on a bent supporting plate for necessary side play as the carroundscurves, there being parts for link supporter and link adjuster, with other novel features, to facilitate the coupling of cars without requiring trainmen to stand between them.

A car coupling has been patented by Mr. Perry F. Randebaugh, of Florence, Kan. The drawhead has a hook with bolts for securing it, there is a depending link pivoted to the pin on which the hook is journaled, and there is an upper link pivoted in the rear end of the drawhead, with a lever for operating the same, the device being adapted for coupling or uncoupling cars from the top or either side.

AGRICULTURAL INVENTIONS.

A harvester has been patented by Mr. Frederick Laqua, of Thielmanton, Minn. The tongue is made in two sections, jointed, and so connected that the forward end of the harvester will be kept from rising too high or dropping too low, the construction being especially designed to take the weight off the horses' necks.

A planter has been patented by Mr. Robert J. Gardner, of Lovelady, Texas. Combined with a seed planter is a main frame having side beams, and a standard carrying a shovel with a presser in its rear, the hopper and planting mechanism being arranged to drop the seed directly in the furrow formed by the shovel and presser.

A cotton cultivator has been patented by Mr. James H. Fowles, of Orangeburg Court House, S. C. It is made to run directly over the seed furrow before or after the plants appear above the ground, breaking the crust and preventing grass from starting, and the cultivating teeth are held at all times projecting directly to the rear of the framing or carriage.

A plow has been patented by Messrs. George W. D. and Lawrence L. Porter, of Fayetteville, Tenn. This invention covers devices by which the standard and beam are so connected that the angle of the standard may be changed to adjust the plow as desired for the particular work being done, and the handles may also be adjusted to suit the convenience of the plowman.

A machine for packing soil beneath the surface has been patented by Mr. Benjamin F. Waggoner, of Litchfield, Ill. The frame is carried by several wheels, so arranged that each of them shall bear an equal weight, and they will be forced into the ground as the machine is drawn across a field, to pack the soil beneath the surface so that it will be firm enough to retain moisture and support the roots of plants.

MISCELLANEOUS INVENTIONS.

A writing pad cover has been patented by Mr. Gustave Hood, of Newark, N. J. This invention consists in the novel construction and combination of various parts, affording receptacles for envelopes, postal cards, pen holder, and pencil.

A shaving mug has been patented by Mr. Thomas Maylor, of Oak Harbor, Washington Ter. In this mug there is such an arrangement of lamp and water cup that the shaving water may be conveniently heated, while a lather cup is pivoted thereto.

A crayon and eraser holder for blackboards has been patented by Mr. Irving W. Barnhart, of Flint, Mich. Combined with a blackboard trough is a wire-netting or perforated piece held above its bottom, to hold the crayons and erasers, so they will not accumulate dust from the rubbing off of the board.

A wagon seat lock has been patented by Mr. Jared Blakeslee, of Story City, Iowa. The device is under the seat, and quite flat against its risers, so as to be out of the way of goods, and the heads of the lock studs, standing outside of the lock plates, serve to prevent the spreading of the sides of the wagon body.

A window ventilator has been patented by Mr. John G. Bronson, of Chicago, Ill. The side rail of the sash has a longitudinal slot in which are fixed slots inclining downward from the inside to the outside, and a screen is secured on the inside and outside of the rail to keep out the dust, mosquitoes, etc.

A shaft holder has been patented by Mr. Amandus Getzschmann, of Omaha, Neb. It is formed of a top leather part and a curved metal rod held thereon, a series of anti-friction rollers or thimbles being mounted on the rod, the object being to prevent binding of the shafts and wear of the holder.

A portable hay and grain cover has been patented by Mr. John M. Sweeney, of Monmouth, Ill. It consists of a series of boards having fastenings on their inner faces, with an eye at one end and a hook on the other, with which a roof-like cover can be quickly made and readily taken off when not required.

A fire proofing and wood preserving compound has been patented by Mr. William H. Polleys, of Melrose, Wis. It is composed of borax, potash, alum, mica cut in muriatic acid, glue, salt, and water, mixed in stated proportions, and applied to different articles of wood after a specified manner.

A fence post has been patented by Mr. Benjamin Wheeler, Jr., of Zanesville, O. It is made of artificial stone in a continuous piece, with a wooden core, transverse grooves for fence wires, and a mortise for the abutting ends of fence rails, one wall of the mortise communicating with the wooden core.

A washboard has been patented by Mr. Ephraim Bailey, of West Newbury, Mass. This invention relates to a novel construction and arrangement of sectional and many-sided rollers in a washboard, in the manner of supporting them centrally, and in alternating them with each other, so they will revolve more easily and lessen the labor of washing.

A sand arrester for driven wells has been patented by Mr. Charles W. Huffman, of Richwood, Ohio. It is placed just below the pump, and consists of an outer inclosing tube within which there projects a continuation of the well pipe, in combination with a screen detachably connected with the outer inclosing tube.

A coat has been patented by Mr. Wilson A. Fulmer, of Harleysville, Pa. It is provided with stiffening layers of canvas and hair cloth and a stay at the lapel, the arrangement of the whole being such as to help make the coat fit well and remain in proper position and shape on the breast without being buttoned.

A door check has been patented by Mr. Joseph A. Coultaus, of Brooklyn, N. Y. The device has a spring in combination with the door frame or casing, and a corrugated fixed track with spring roller carrier and attached roller, the whole intended to hold doors more or less open and prevent them from slamming when closing.

A razor has been patented by Mr. Samuel J. Dyer, of Brooklyn, N. Y. This invention covers a construction of blade and blade holder, with ordinary handle, whereby the blade can be honed with a double bevel on its edge, and the blade can be perfectly adjusted to give absolute width and angle to be affected by the honing.

A neck yoke strap has been patented by Mr. George H. Lynds, of Sterling, Kan. It has a fastening composed of a layer of wire extending around the neck yoke and pole openings, the metal concealed within the body of the strap, but so placed as to give greatly increased strength when the wear is great and breakage often happens.

A life preserver has been patented by Mr. Paul Kingston, of Hastings, Minn. It is made of waterproof flexible fabric, on a frame, to the ends of which a bow and stern bar are hinged, and has inflatable sacks connected together and with an air pump, the device being one which can be folded compactly and capable of being converted into a boat.

A gate has been patented by Mr. James H. Carpenter, of Hyndman, Pa. It has balancing arms so pivoted that the gate may be easily operated, with other novel features, its construction being such that it is well adapted for use on side hills and other localities where a horizontally swinging gate cannot be employed.

A dumping cart has been patented by Mr. Thomas Hill, of Jersey City, N. J. The tail board has combined with the axle or frame radius rods, or pivoted connections, whereby, on raising the front or tipping the rear end of the body, the tail board will be automatically opened, and will be closed and held closed on returning the box to its nominal position.

A machine for filing gin saws has been patented by Messrs. James S. Mosley and Thomas J. Mancill, of Atlanta, Miss. Combined with a frame and vertical plate are crank wheels and shaft to vibrate the file holders, while the pitman may have a longer or shorter stroke, and the machine can be adjusted for filing gin saws with teeth of different sizes.

A folding bed has been patented by Mr. Ernst N. Doring, of New York city. Combined with stationary and movable sides are curved tracks and pivot wheels, of novel construction, which operate so that the pivoting points of the movable sides will adjust themselves as the bed is being opened and folded.

A sidewalk clearer has been patented by Mr. Charles E. Bartram, of Fredonia, N. Y. It is made with a base frame widened toward its forward end, with a bottom, flanges at its sides and rear, a handle, and carried by wheels and an axle, the device being adapted to facilitate the removal of snow and ice from sidewalks.

A process of preserving brewers' grains has been patented by Mr. William Ihne, of Medford, Wis. It consists in first draining, then treating the grains successively with a solution of common salt, a solution of dextrine, and a solution of permanganate of potassa, and afterward filtering and subjecting to pressure to form compact cakes of convenient size.

A pipe holder and lifter has been patented by Mr. E. Stillman Babcock, of Milton, Wis. Combined with a jaw block is a pivoted clamping lever, an eccentric pivoted therein, and a lever for raising or lifting the pipe, the device being more especially adapted for raising pipes from artesian, oil, and other wells, and lowering the same.

A churn has been patented by Mr. George J. Clark, of Ayersville, O. The churning device is held on the cover, and can be easily removed with it to clean the cream box, while the construction is such that by turning a craft rocking shafts are operated, and dasher plates thereon alternately raised and lowered in opposite directions.

A washing machine has been patented by Mr. John B. Richardson, of Pleasant Plains, Ill. It is a covered tub with interior projecting ribs, a clothes wheel journaled in the tub carrying peripheral bars or slats, provided on their outer faces with cords for holding the clothes to the wheel, springs being arranged to prevent tearing strains on the clothes by the tie cords.

A slate pencil sharpener has been patented by Hattie Scott, of Detroit, Mich. Combined with an abrading disk, and gearing for revolving it, is a support adjacent to the disk, with a curved line and a number of notches for receiving the pencils, the lower part of the grindstone dipping into water and preventing the slate dust from spreading.

A washing machine has been patented by Mr. William T. Venable, or Christiansburg Precinct, Ky. In a suitable tub or box is a circularly reciprocating disk, operated by crank handles, and from this disk wooden or metal pins project downward, the pins whirling the clothes about and agitating the water, with other novel features.

A pistol for shooting marbles has been patented by Mr. James W. Smith, of Jersey City, N. J. A coil spring held in a pocket on the under side of the barrel is connected with a rod in the barrel, and the trigger, in such way that by pulling the latter the rear head of the rod is disengaged, and very forcibly ejects the ball.

A cut-off table for tile machines has been patented by Mr. Charles W. Crawford, of Brazil, Ind. It consists of a series of rollers in a horizontal adjustable frame, with two rows of rollers attached to inclined frames, adapted to advance or recede relatively as desired, the table facilitating the carrying off of tiles, guiding them laterally and supporting them to prevent flattening and chafing.

Photographic sensitive paper forms the subject of a patent issued to Mr. Thomas C. Roche, of Brooklyn, N. Y. It is made with the body of the paper inclosed between two sensitive films of gelatine silver emulsion, all carried on a single sheet of paper, to be used in the camera for the production of negatives or in printing frames for positive pictures, in the usual manner.

A self-adjusting chain sling has been patented by Mr. William Smith, of Brooklyn, N. Y. It consists of a number of chains united to an upper link or ring, each chain carrying a link or ring at its lower end, and each chain passing through the link carried by the adjacent chain upon one side, the device being more especially for grappling submarine, but also applicable for hoisting heavy goods.

A wax heater for sewing machines has been patented by Mr. Benjamin F. Landis, of St. Joseph, Mo. The wax reservoir is hung lower than the bottom of the shuttle race, with a water boiler and combustion chamber beneath, and the arrangement is such that the heated air is moistened to have a mellow action on the thread, while establishing a current in the proper direction.

A water closet has been patented by Mr. Philip Brady, of New York city. The bowl of the soil pipe has a valve chamber just below the bowl, and a pipe connected therewith extends upward to a point below the top of the bowl and then down, while connected with the soil pipe below the valve chamber is a valve and ventilating pipe connected with an overflow pipe, so that the overflow can be used on baths, basins, etc., as well as on water closet bowls.

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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 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) G. A. asks the best and quickest way to dip brass and dry it after rinsing, so as to retain its bright color. A. Wash in hot soap suds with a soft brush, rinse in clean hot water, and dry in sawdust. Boxwood sawdust is best. Beach, maple, or white pine will do.

(2) E. R. S. asks: In a solid brick wall is there any more weight upon one brick than another? A. Not at the same height.

(3) J. M. B. asks what the coating used on soil pipe is composed of, and the process of putting it on. A. Coal tar, heated in an iron vat of suitable size for dipping the pipe, which is warmed to make it dry, and dipped and drained hot.

(4) C. S. writes: I heard it stated by a scientific engineer that if the scientific principles of mechanics were carried out in constructing a locomotive, it would not run. A. The scientific engineer was probably a scientific crank, or he would have explained the meaning of his assertion.

(5) A. I. I. writes: We laid a common black gas pipe under the railroad where the track had been ballasted with slack coal, and within four weeks' time the pipe was full of holes eaten from the outside. What was it that caused it? Was it the water and leachings off of the coal standing in the trench? A. The coal slack contains sulphur, which soon eats through iron pipe. Lead pipe will be better, and last much longer if it is necessary to lay it in the coal slackor where the water from coal slack may come in contact with it.

(6) B. A. C.—New plated work, if not burnished, requires buffing with felt buff and rotten stone. Then brush or buff with a soft felt and rouge. This is not as good as burnishing, as the burnisher hardens the surface.

(7) T. W. writes: I wish to know if malleable iron is welded together or can be welded to wrought iron? A. Malleable iron may be welded to iron and low steel, as you may see by examining malleable shears with steel faces. Use borax melted with 10 per cent of salammoniac for a flux. Mix and cool, then powder, and use in the same manner as borax powder.

(8) J. H. V. and M. P. L.—For etching brands and marks on polished steel surfaces, such as saws, knife blades, and tools, where there are many pieces to be done alike, procure a rubber stamp with the required design made so that the letters and figure that are to be bitten by the acid shall be depressed in the stamp. Have a plain border around the design, large enough to allow a little border of common putty to be laid around the edge of the stamped design to receive the acid. For ink, use resin, lard, oil, turpentine, and lampblack. To ¼ pound of resin put 1 teaspoonful lard oil; melt, and stir in a tablespoonful of lampblack; thoroughly mix, and add enough turpentine to make it of the consistency of printer's ink when cold. Use this on the stamp in the same manner as when stamping with ink. When the plate is stamped, place a little border of common putty around and on the edge of the stamped ground. Then pour within the border enough acid mixture to cover the figure, and let it stand a few moments, according to the depth required, then pour the acid off. Rinse the surface with clean water; take off the putty border, and clean off the ink with turpentine. Use care not to spill the acid over the polished part of the article. For the acid, 1 part nitric acid, 1 part hydrochloric acid, to 10 parts water by measure. If the effervescence seems too active, add more water.

(9) M. & P. write: We have in contemplation the erection of a grist mill. The location necessitates a subterranean passage of water to the mill or a deep cut water way. Wood as a support of the earth would soon rot. We know where we can purchase two engine boilers second hand, and want to know how long they would probably last in such a position. A. We could not venture to give more than a general opinion. If the iron is ¼ inch thick all over, and well painted with coal tar outside and inside when laid, it might last a good many years.

(10) F. H. asks: Which of the following materials is the best for deafening for a skating rink located upstairs: Mortar, cement, asbestos felt, other felt, wool (prepared?) sawdust, and gravel? A. Mortar and cement are not used for deafening on the top of the floor on which the skating floor is laid. It is too hard, and is good only as a plaster between the beams in the usual way. Asbestos and wool are very expensive, but good. Common roofing felt laid upon the originalfloor, and covered with a mixture of about equal parts of fine clean sand and sawdust about 1 inch thick, upon which lay furring strips and skating floor, makes the best insulator that we can suggest.

(11) J. F. W. asks how long a box holding gasoline, made of wood, covered with No. 16 zinc, buried 8 feet underground, would last, and whether it would last longer than galvanized iron? A. The wood in the box would last many years. The zinc would corrode on the outside only, and if as thick as No. 18 or 20 wire gauge, should last five years in a favorable soil. There is a great difference in soils as to their oxidizing effects. The zinc should last longer than the galvanized iron.

(12) L. H.—If your "red nose" is caused by dram drinking, nothing but abstinence therefrom will remedy the evil. If it comes from any other curable cause, you had better consult a physician.

(13) G. B.—The article on "Beer Stronger than Whiskey," which has been going the rounds of the papers lately, credited to the SCIENTIFIC AMERICAN, was copied by us several years ago from the *Inebriates' Journal*, and published as a clipping from that periodical.

(14) S. M. S.—The difference between charcoal and coke tin only shows in working; charcoal tin is the toughest. The best tin for roofing is called tern plate or roofing tin. It is covered with an alloy of tin and lead.

(15) H. W. P. sends a plant for identification. A. It is the milk thistle (*Carduus Marianus*). It has no remedial qualities. Its use as a remedy for snake bite was probably suggested by the variegated leaves, the ancient "doctrine of signatures" being still believed in by the ignorant.

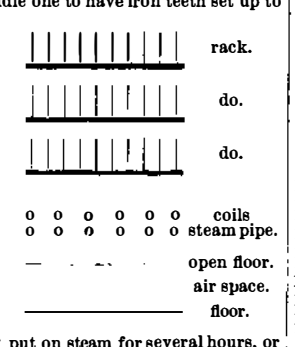
(16) W. P. L. asks whether lead lining is injurious to brass, silver, or gold solutions; if so, what is best for lining tanks? A. Lead is not good. Glass, asphaltum, or paraffine is good. A wooden tank covered on inside with paraffine, by melting and spreading over the surface of the wood with a hot iron, is cheap and quickly done.

(17) H. B. writes: In the barometer described in SCIENTIFIC AMERICAN of August 22, does the compressed air force the liquid to the top of the tube in changing weather, or what causes it? A. Variations in atmospheric pressure act upon the surface of the liquid in a barometer tube; increased pressure sending the liquid down (in the open end), and *vice versa*. Variation in temperature also varies the column. Heat makes the column rise, and cold makes it fall, the compressed air in the bottle keeping the liquid column at its normal height; the bottle being sealed airtight.

(18) S. A. C.—There is no evidence, to our knowledge, of the use of iron by the early inhabitants of Central America; nor is there any evidence that it was not used, as iron utensils or tools might lose their identity by oxidation and absorption in the period which has since elapsed.

(19) T. H. De L. writes: We are using as fuel in boiler furnaces (return tubular) Georgia pine and bituminous coal, first throwing in a "fire" of the wood and then from ten to fifteen shovelfuls of the coal. Is there any objection to this, looking at it from an economic (or any other) point of view? A. Not knowing the value of Georgia pine wood and Cumberland coal in your place, we cannot estimate their relative economy as fuel. It seems to us rather strange and eccentric to fire boilers in the manner you describe. Both of the materials of combustion being of a soot producing nature, we should judge that the flues would foul very rapidly. An engineer that understands firing with Cumberland coal alone so manages the fire as produce the least amount of unconsumed carbon in the escaping products of combustion. We cannot see any advantage in using wood and coal alternately. It seems impossible to keep a bright back fire for consuming the smoke.

(20) C. H. S. writes: I wish to construct a kiln drier, of about 7,000 superficial feet capacity, in connection with my steam saw mill—steam capacity, 90 H. P.—for drying hard and soft wood, taking it for granted the exhaust will afford sufficient heat for kiln when working. A. Build your drying room a little longer than the longest lumber to be dried; make it 8 ft. high, and about 7 ft. wide for a thousand feet of boards, or about 800 cubic feet capacity. Such a room with exhaust steam will require a coil of 1 in. pipe, two pipes high, 3 inches center to center of pipes, to cover the entire floor—say 750 ft. of 1 in. pipe. The headers into which the 1 in. pipes connect should be, for above coil, made of 4 in. pipe drilled and tapped. The connecting pipe should be 2½ in., or proportional for larger coils. So arrange outlets as to drip all the water and give free vent to steam; you will need not more than ½ pound back pressure on engine; if well planned, much less. A gate valve in the exhaust connection with a live steam inlet to coil ¾ in. will enable you to keep steam in coil when engine is not running. The floor boards of room should be narrow, and laid with ½ in. openings between the boards, and a space below floor that can be closed or opened to control the ventilation. There should also be several openings at top of room, with dampers. The best way to pile the lumber for effective and uniform drying is to place it on edge in racks, as in the room above indicated, three racks high, of hard wood scantling, and for boards three racks in the length of the room, the middle one to have iron teeth set up to keep the boards on edge, as shownherewith. The greatest trouble arises in many drying rooms from the piling of the lumber too close, which obstructs circulation of air among the pieces, and hence no drying. The operation should be as follows: After filling the room with lumber *close it tight;* put on steam for several hours, or until the lumber becomes heated through, then ventilate slowly to carry off the moisture. This saves much cracking by surface drying.



(21) C. R. C. asks: Will you please inform me through the SCIENTIFIC AMERICAN how large a surface I will need, to attach a ground wire to, for a telegraph line about half a mile in length, also how deep it will need to be buried? A. A good groundplate should be made of copper, having a surface of about fifteen square feet. Larger would be better. This plate should be buried in earth that is constantly moist. Water and gas pipes form a good electrical ground.

(22) W. E. asks whether boards ever swell and shrink lengthwise, *i. e.*, with the grain, or not. A. The effect of moisture upon the length of boards is the reverse of its effect upon their width. That is, when the board is wet, it is shorter than when it is dry.

(23) C. D. D. asks: 1. Is the difference between a permanent magnet and an electro magnet, this: The former is magnetized at any and all times, and the latter only when acted upon by a current of electricity and demagnetized as soon as or soon after the current is broken? A. Yes. 2. Is the current of electricity, in an electric light machine caused by the revolving of the armature between the field magnets, or by the brushes in contact with the commutator? A. It is caused by the revolving of the armature. The brushes simply take off the current.

(24) E. A. C. writes: Where can I find working drawings and description of a small dynamo? Also of electric motor capable of running a small fan or toy boat? I wish the dynamo to give an electromotive force sufficient to light three Edison 6 candle power lamps. Thinking that you may have previous papers relating to them. A. You will find a full description of a small dynamo in SUPPLEMENT, No. 161. If you desire to run three six candle power lamps, you should make a dynamo of double the size given in the article referred to.

(25) H. W. asks: Do you know of a furnace that will volatilize gold, silver, etc., from the ore or from the metal? If so, will you kindly give me the name and address. A. The only furnace we know of that will volatilize gold and silver is the electric arc furnace, made by Siemens, of London.

(26) A. H. M. writes: I have been trying to make some permanent bar magnets by making a spool of No. 18 insulated copper wire 3 inches long, the wire being wound half an inch thick on spool and then placing the spool in circuit of an electric light dynamo, then passing a ¾ inch by .6 inch round steel bar back and forth in the spool. I stop the spool on the center of the bar, and stop the dynamo before taking it out. This magnetizes the bar, but it is not very strong; is there any other method for making it stronger with the use of the dynamo? A. The trouble probably lies in your steel. Try ordinary machinery steel hardened only at the ends.

(27) B. F. T. asks: Will you please inform me what substance (cement or other) is used for sticking the emery to the "rifles" or hones used for sharpening scythes? A. A good quality of common glue.

(28) G. K. asks: What is needed for making nickel solution plate a good white color? My solution is plating a kind of cream color; my work is principally stove work. Also a receipt for making lime cake for buffing stove plates. A. Consult SUPPLEMENT, Nos. 152, 192, and 425, in which the subject of nickel plating is treated.

(29) J. W. M. asks: 1. Have you a good book on electricity for a beginner? One that explains the term used by electricians and others. A. Consult Ganot's Physics. Thompson's "Electricity and Magnetism" is a good book for beginners. 2. Do you know of any experiments tried by Mr. Wise, of St. Louis, in ballooning? It is said he has an airship (Chambers's Encyclopedia) in which he can cross the ocean in 48 hours. A. The experiment has not been tried, and considerable improvement in aerial navigation will be needed before it can be successfully accomplished.

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