ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. William Emmett, of Logansport, Ind. The drawbar is formed with a weight, and the drawhead has rounded claws and a concave or cam, for causing the drawheads to rotate when the cars are brought together, making an automatic coupling that is not liable to get out of order.

A rail friction clamp has been patented by Mr. William Emmett, of Logansport, Ind. It consists of two clamp bars shaped to fit against the web and top of the base of the rail, these bars having a flat straight base part so made that when the outer edge of the base part rests against the under side of the rail base, the inner edge will be a short distance from the inner side of the rail base, the base having tongues and recesses for locking them together.

A valve gear has been patented by Mr. James B. Quinn, of St. Paul, Minn. It consists of two swinging arms deriving their motion from the wheel shaft, two arms imparting motion to the slide valve and automatically cutting off steam by adjustable dogs placed on segments, and a device for regulating the position of the dogs on the segments, the gear being especially adapted for stern wheel steamers using a high pressure engine on one side and low pressure on the other.

AGRICULTURAL INVENTIONS.

A marking attachment for corn planters has been patented by Mr. William H. Clay, of Paris, Ky. It is pivoted to a swiveled piece, with a device fastened to the seat for locking, and a pivoted movable rope carrier, secured to an inclined frame, so the attachment can be shifted from one side of a corn planter to the other.

MISCELLANEOUS INVENTIONS.

A brake for vehicles has been patented by Mr. John B. Hinton, of San Diego, Cal. It is especially designed for vehicles whose fore wheels turn under the box or bed in a place made for that purpose, and the brake is made to operate by the application of a flexible cable.

An animal poke has been patented by Mr. David F. Sandusky, of McLeansborough, Ill. It is a yoke so made that a lever will act to hit the animal on the nose and cause him to start back as he approaches a fence, but will not interfere with the grazing of the animal wearing it.

A mangle has been patented by Catharine Whitney, of Lawrence, Kan. By this invention large wooden rollers are used for smoothing clothes, there being receptacles for clothes ironed and unironed, and means whereby the weight of these receptacles and their clothes are utilized in the ironing process.

A log boat has been patented by Mr. William A. Dexter, of Dayton, N. Y. It is so made as to accommodate itself by both wheels and runners to hard or soft ground, and thus be drawn easier than boats or sleds not having wheels so arranged, saving labor of men and animals in getting out timber.

An attachment for bedsteads has been patented by Mr. James W. Bowles, of Louisville, Ky. This invention provides a guard board which may be used to separate two or more persons sleeping in a bed, or may be used at the edge of a bed to prevent children and others from falling out.

A freight checking device has been patented by Mr. William B. Thomas, of Athens, Ga. The invention covers a tilting lever and means for connecting it with registering mechanism, the device to be placed on the station platform, and being especially adapted for registering the shipment of cotton bales.

A fastening band for packages of merchandise has been patented by Mr. Samuel W. Page, of Jersey City, N. J. It is flexible, one end being plain and the other having attached a metal clip with clinching prongs, and short hook-shaped sharp teeth for engagement with the plain end.

A fire escape has been patented by Messrs. Robert M. Henderson and John A. Glaesline, of Jackson County, Ind. (P. O., Leesville, Ind.) It is made in sections, adapted to be drawn out so the ladder may be made to reach any desired height, can be operated by one person, and adjusted and set to any required inclination before the sliding portions are raised.

A revolving sweeping attachment for spinning mules has been patented by Mr. Charles Ashworth, of Grosvenor Dale, Conn. It has a sweeping roller so operated as to gather up and retain the sweepings, and form them into a mat or web around the roller, from which the sweepings may be cut, furnishing a compact bat or web.

A radially folding synchronous chart has been patented by Messrs. James M. Ludlow, Isaac K. Funk, and Adam W. Wagnalls. It is made with a series of sector-shaped plates, pivoted and divided into a fan-like arrangement, to constitute historical charts, or so that events for the same century, year, etc., may be readily compared.

Stringing pianos forms the subject of a patent issued to Mr. James F. Conover, of New York city. This invention provides additional pressure strings adjacent to the long covered and plain strings, the additional strings resting on the bridge and exerting a pressure thereon, but not being struck by the hammer, and not sounded.

A boot or shoe has been patented by Mr. Henry W. Joslin, of Titusville, N. J. It is designed to prevent moisture from penetrating the uppers around the edge of the soles, and the invention provides for a strip of waterproof material secured to the outer side of the upper along the edge of the sole at the forward part of the boot or shoe.

A turning machine has been patented by Mr. Albert T. Booth, of Meriden, Conn. This invention covers improvements on a former patented invention of the same inventor, including means for operating and controlling the chuck, whereby it is made to automatically tighten its hold, and may be readily released as desired, while the mechanism is simplified.

A washing machine has been patented by Mr. Samuel Martin, of Hartland, Mich. Combined with a tub is a shaft on which rollers are held, and a pivoted frame in which end rollers are held, over which an endless belt passes, on which transverse ribs are secured, the clothes being rubbed between the rollers and the ribs on the belt.

A fifth wheel attachment has been patented by Mr. Adelbert A. Meyers, of St. Louis, Mo. It consists of a small roller mounted on the end of a spring in position to bear hard against the under side of the movable part of the fifth wheel, the spring and roller being within a casting which acts as the main brace and coupling clip of the running gear.

A clasp for ribbon rolls has been patented by Mr. Edwin W. Raymond, of Coupeville, Washington Ter. It is made of a piece of spring metal folded upon itself to form parallel clasping arms, one arm being bent to form a lip or stop to keep the clasp in place upon the goods and the goods in place upon the roll.

A handle for package carriers has been patented by Carrie C. Boyd, of Fruitport, Mich. It is made with a central part forming a hand grasp, and with opposite ends bent to form three open loops, into which the cord of the package passes when the handle is applied, to facilitate the convenient carriage of packages bound with cord or twine.

A fire escape has been patented by Mr. Thomas D. McKinzie, of Colorado, Tex. It consists of a car and elevator chain, with various novel details, whereby the lowering of the car is made easy, the occupants may be shielded from smoke and flame, the apparatus may be conveniently housed when not in use, and cannot be used by burglars.

An oil drip washer for roller skates has been patented by Mr. Louis Steinberger, of New York city. It is a metallic washer provided with an adjustable and removable fibrous drip, to catch and absorb the oil escaping from the axle and hub, the drip surrounding the edge and extending over a portion of the two surfaces of the washer.

A safe deposit vault has been patented by Mr. Rufus E. Dixon, of New York city. This invention covers a frame with central compartments surrounded by outer ones, in combination with a shell and surrounding masonry, the frame being adapted to revolve in the shell, with other novel features, to afford the most complete protection against fire and burglars.

An apparatus for smelting and calcining lead and other ores has been patented by Mr. Elliott R. Moffet, of Joplin, Mo. It is so made that the fumes from the roaster or calcining furnace are drawn or passed direct into the cupola furnace, and the air supplied to the cupola furnace is heated by the heat from the calcining furnace, with other novel features.

A ribbon reel has been patented by Mr. James E. McMurtrie, of Saxton, Pa. It has opposite slotted frame bars, with inturned and slotted end parts, clamp plates and screws, with other novel features, the device being intended for holding bolts of ribbon, braid, and the like, so that any desired quantity may be reeled off, and the loose end will be held firmly.

A gas pressure regulator has been patented by Mr. Robert F. Hatfield, of New York city. Combined with the inlet pipe, cylinder attached to the float, and cone attached to the inner case of the regulator, are a valve and cylinder rigidly connected with each other and with the cylinder, whereby the descent of the float will wholly prevent the inflow of gas.

An automatic registering machine has been patented by Mr. William H. Barber, of Ward, O. It is made so that an enumerating tape may be transferred back and forth upon separate drums, with transferring rollers having an intermittent movement to carry the enumerating tape a certain distance at every intermittent movement, for use with bagging and weighing devices, etc.

A washing machine has been patented by Mr. Hiram H. Tuttle, of Phœnix, Arizona Ter. This invention covers an improvement in that class of washing machines in which a cylinder clothes carrier is supported and revolved within a steam boiler or case, the cylindrical body having a novel construction, and so the cylinders can be sold separately to be applied to an ordinary boiler or steam case.

A water gate has been patented by Mr. William A. Lovelace, of Lovelaceville, Ky. It is made in two sections, and has hollow posts with openings for the water to lift floats to raise the gate as the water rises, being more especially designed to prevent live stock from trespassing on adjacent lands, while so made as to clear floating substances drifting down stream.

A folding and pasting machine for forming cornucopia paper bags has been patented by Mr. John N. Chadsey, of Valatie, N. Y. This invention covers a novel construction and combination of parts by which the blanks, as fed to the feed rollers, are properly folded for a pasting edge, formed and pasted, and the pasted edges compressed into proper shape to form the bag.

A hot air stove has been patented by Mr. Richard A. Rew, of Pomeroy, Washington Ter. Combined with a cold air supply pipe and a distributing chamber divided into communicating sections by radial partitions, is a stove with inner and outer casings, so that pure air can be taken into the stove, warmed to any desired temperature, and discharged into the apartment to be heated, thus insuring perfect ventilation.

A process of and apparatus for remelting soap form the subject of two patents issued to Mr. John C. Ralston, of Toledo, Ohio. The process consists in subjecting the soap scrap to the action of heat and open steam simultaneously to soften and melt the same, and then subjecting the melted soap to the action of heat to emove the surplus moisture, the apparatus covering a suitable vessel, in its upper part a holder for the scrap, over a system of steam jet pipes, with a steam heating coil below the jet pipes, with other novel features, whereby the superfluous steam is not condensed in the melted soap.

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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) C. L. W. writes: Can you favor me with a plain explanation of Coddington's method of finding the radii of an achromatic object glass? I have Coddington's book, but it is too deep for me, as I do not understand algebra very well. In the *English Mechanic* for August and September, 1883, there is given an explanation of the method, but I do not understand how it is applied in practice. What I want is plain directions in simple language, and perhaps one or two examples showing how every step is taken, and how the numbers are derived, so that I can work out any example in practice myself. A. The formulas of Coddington and his contemporaries were very imperfect, and not suited to the requirements of late practice. The formulas published in a series of papers in the *English Mechanic* are somewhat better, but still imperfect, because the refractive and dispersive indices of both crown and flint lenses must not only have certain fixed relations as regards each other, for achromatism, but must also have certain relations in composition and density, to obtain correction in spherical aberration coincident with achromatism. These conditions are only fully understood as necessary for practical work by a few successful opticians. Professor Hastings claims to have made computations that led to practical and exact results, but they are not plain, simple, explanations that anybody can follow with all kinds of glass. The character of the glass, both flint and crown, must be an exact factor in any computation. In practice this can only be found by trial. For your consideration we give you the curves of some well known and successful objectives. Clark's 26 inch object glass at the Observatory, Washington (Fig. 1), 1st,

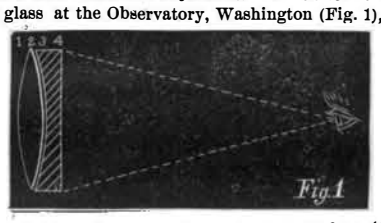

Fig. 1

2d, and 3d surfaces equal curves; 4th surface (flint) slightly convex, and varied to make the final correction. Densities and indices unknown to us. The objective at Princeton, 23 inches diameter (Fig. 2), also by

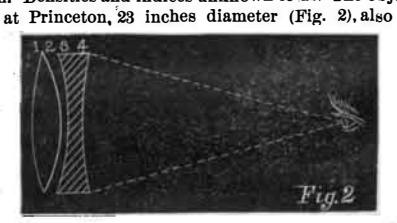

Fig. 2

Clark, is evidently made of glass of quite a different character, as will be seen by comparison of the relative forms of curves:

1st surface	.....	265·8″ rad.
2d "	.....	81·9″ "
	(both of these convex.)	
3d "	.....	73·4″ "
4th "	.....	222·2″ "
	(both of these being flint glass concave.)	

The lenses set 7½″ apart.

The Hastings object glass (Fig. 3) is reversed, having the

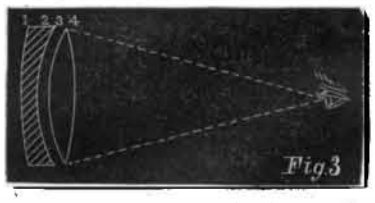

Fig. 3

crown convex lens on the focal side, is 9$\frac{4}{10}$″ diameter, and the glasses are set $\frac{1}{10}$″ apart, curves as follows:

Flint	1st surface	.....	121·2 ″ convex.
	2d "	.....	34·22″ concave.
Crown	3d "	.....	34·48″ convex.
	4th "	.....	108·4 ″ convex.

The density of these glasses is as follows:

Flint 3·516, refractive index 1·615; crown 2·563, refractive index 1·523. Focal distance not known to us, but supposed to be between 9 and 10 feet.

(2) G. H. B. asks a receipt for cheap, substantial gold plate, to use on nickel plated roller skates for exhibition, to apply without the aid of any machine. A. Do not know of any other method than electro-plating that will bear polishing or add to the beauty of nickel plate. A dip solution will be dull, and look more like brass than gold.

(3) H. R. asks: Will you be kind enough to give me a receipt for making soft yellow solder, as I have a number of joints to make, and common soft solder shows too plain, and cannot use hard solder, for the work will not stand to be heated hot enough to melt hard solder? A. We know of no method of making yellow soft solder; you can color the solder, after it has been applied, by means of the colored lacquers.

(4) W. K. L. asks: Of what and how are grindstones made? A. Grindstones are made from natural sandstone, the stones being cut roughly into shape and afterward turned.

(5) W. A. P. writes: 1. I am making the dynamo described in SUPPLEMENT, No. 161, and I have been at a loss to know how to make the armature. Should it (the cast iron part) be like the letter H, and the brass heads fastened to the side pieces? A. The armature should be of very soft gray cast iron of H form, as indicated in your sketch, and shown in the drawings in SUPPLEMENT, No. 161. The brass heads are fastened to the projecting ends of the side piece. 2. Also, what number of SUPPLEMENT has the best working drawings for an electric motor, one about the size of the dynamo in No. 161 SUPPLEMENT? A. You can make the motor from the same drawings, using No. 16 wire on the armature, and fewer layers of wire upon the field magnet, say three or four instead of seven.

(6) W. B. asks: If I take two carbon plates 3x4, and place them in a jar containing a solution of sulphuric acid and bichromate of potash, with a zinc plate of similar size between them, would I get electricity of sufficient electromotive force to run an incandescent lamp, and if so, what number of candle power lamp would six similar cells run? A. Six cells of such a battery as you describe would run a 5 or 6 candle power lamp for a short time. 2. Could I increase the power of the battery by a different relative size of plates? A. You can increase the quantity of current by this means. 3. Would the batteries be constant? A. No; this form of battery, although very powerful and efficient for experimental purposes, is not adapted to continual use, as it soon polarizes. 4. Are magnets made of hardened steel better than those made of common bar steel? A. The steel for magnets must be hardened to render them permanent.

(7) J. C. S.—The affection indicated (pimples on the face) is known in medical works as acne. It is not of the slightest consequence, except that its presence on the face causes annoyance as a disfigurement. It is no indication of ill health, and needs no medicine, unless the digestion be impaired from other causes. Sulphur ointment applied at night and washed away in the morning with abundance of soft soap and warm water helps to improve the looks. The pimples commonly disappear by the age of 20 to 22.

(8) H. L. G. asks: 1. If a supply steam pipe is at the end of a boiler, would it cause the water in the boiler to foam? A. Not necessarily. 2. If the foaming is caused by soap or oil, would I be right to pump soda in the boiler or blow off? A. Yes; pump in a little dissolved soda and blow off, and repeat until the boiler is clean.

(9) A. W. M. asks (1) how to make a Leyden jar. A. Take a thin wide mouthed jar; varnish it with shellac inside and outside; allow the varnish to dry; then take some sheets of tin foil and varnish them with shellac, and as soon as the varnish becomes tacky, apply the varnished surface of the leaf to the varnished surface of the jar, rubbing it down thoroughly over every part to insure perfect adhesion. The jar should be coated over both its inner and outer surfaces to within about one-third of its height from the top. 2. Can a Leyden jar be charged with one of the small magneto-electric machines costing $10.00, or only by frictional electricity developed by a Holtz machine or something similar? Would a frictional machine be difficult to make, and where could I find instructions? A. No; only static or frictional electricity can be used in charging a Leyden jar. A frictional electric machine is easily made, but we advise you to make a Holtz machine or a Wimshurst machine. For a full description of the construction of the Holtz electrical machine consult SUPPLEMENT, Nos. 278, 279, and 282. For a description of the Wimshurst machine consult SUPPLEMENT, No. 359.

(10) M. L. asks: 1. Can a battery of Leclanche cells that have been run out on closed circuit be renewed by being repacked with fresh oxide of manganese, or are the carbons injured as well as the manganese that the cells polarized? A. The oxide of manganese should be renewed, and the porous cells, and the carbon should be soaked in warm water for some time previous to refilling the cells with the oxide of manganese. 2. If by polarization is meant that the fluid next to the carbon is impoverished, and prevents the stronger solution from acting on the carbons, can I not remedy that by punching a hole in the pitch on top of the porous cup, and let all the fluid out (which is chlor. zinc, I believe), and would not a new lot of fluid filter through the cups, and thus renew their strength, provided I strengthened the solution in the outer jars? Or is the manganese useless, or are the pores of the porous cups filled with anything to prevent the passage of the fluid? A. Your remedy would not cure the difficulty. The manganese is rendered worthless by long use in the battery.

(11) M. E. R. desires a method of dyeing fur without injuring the fur or skin. A. Experience is very important in dyeing valuable furs. For brown, tincture of logwood is used. For black, logwood and copperas. For red, ground Brazil wood ½ pound, water 1½ quarts, cochineal ½ ounce; boil the Brazil wood in the water one hour, strain, and add the cochineal; boil 15 minutes.

(12) E. P. M. asks: What preparation or salt of mercury is known as the protosulphate? What other name is it known by? A. It is also known as mercurous sulphate. It is prepared by adding sulphuric acid to a solution of mercurous nitrate. It forms a white crystalline powder, and is but slightly soluble in water.

(13) E. G. asks: Will a turpentine bath soften or bring the surface of carbon paper to life again? If not, what will do it, and how applied? A. It will not. It is probable that you are using a poor quality of paper. It may perhaps be improved by laying between oil sheets.

(14) E. H. C.—There are stringent laws in most of the States prohibiting the sale of kerosene unless it be of proper grade. There is no danger from kerosene if properly handled.

(15) E. F. B.—The attraction of gravitation is greatest at the earth's surface. It is nothing at the center.

(16) H. S. asks what the word antipyrine means. A. Antipyrine is the name given to a recent derivative from coal tar. On account of its similarity to quinine, and its like properties, it has been sold as a substitute for this well known febrifuge.

(17) M. J. desires (1) something that will keep the hair curly, that is, the bangs. A. Use the liquid obtained by boiling, for ten minutes, 1 drachm quince seeds in ½ pint water and straining, or steep 6 ounces gum tragacanth for 30 hours in 1 gallon rose water, stirring frequently; strain through a cloth, and let stand for a few days; then strain again, and work into it 4 drachms oil of rose. 2. Will wearing spectacles that are fastened on the nose reduce the size of the nose? A. They may somewhat modify the form of the nose, but it is improbable that the size will be changed.

(18) J. R. M. writes: The top of the cold air pipe which supplies the air to my furnace is one foot below the level of the floor where the first registers are; and I would like to extend the pipe higher, so as to avoid getting the air so near the surface of the ground. How high can I make it, so as to avoid any danger of the draught carrying the air out of the house instead of into it? A. If the cold air box terminates at the bottom of the hot air chamber of the furnace, there will be no danger of a back draught up the cold air box. You may extend it up as far as required for fresh air.

(19) L. V. would like (1) some simple process of purifying skunk's oil. A. Agitation with charcoal and filtration are the only simple means that we can suggest. 2. Which is best and cheapest as an anodyne for a liniment—chloroform or laudanum? A. Chloroform is probably the cheaper article to use, but laudanum is more satisfactory in its action, and is easy to handle.

(20) E. C. asks why slate forms between the layers of coal. Also, why hydrogen contains more latent heat or produces more intense heat in its flame than any other gas? A. Coal has been formed by the growth and decay of vegetation, in the presence of water, as in our present peat swamps. It was therefore accumulated at the mouths of rivers or in localities subject to floods. These alternations covered long periods of time, and while the swamp or bog was sufficiently above water to support vegetation, coal, or rather the peat from which it is formed, accumulated, and in times of submergence, mechanical sediments, such as sandstones and slates, were deposited on top of the former peat. When the subsidence was greater than usual, and the sea invaded the swamp, limestones were formed. In this manner we account for the immense masses of limestone and sandstone in the coal measures, as well as for the thinner partings of clay and slate. The transition from swamp to lagoon is marked by the coaly shales, mixtures of carbonaceous matter, and mineral sediment. The same process on a smaller scale is now to be seen in several localities in the South. —The heat produced by the chemical combination of two elements is due to the fact that by the impact of the combining molecules, the molecular motion is converted into a rotary or vibratory motion of the molecules of the resulting body, and becomes manifest to us as heat or light. In the combustion of hydrogen, by which two atoms unite with one atom of oxygen to form water, the greatest heat is produced, because the energy of chemical combination, or the immense velocity of molecular impact, produces a corresponding motion of the molecule of water. The energy of the chemical combination between these elements is due to their extreme positions in the electro chemical series, which produces a strong chemical affinity.

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October 27, 1885,

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