ENGINEERING INVENTION.

A lock for bolts of pistons has been patented by Messrs. Joseph Wormald and Joseph Wormald, Jr., of Missoula, Montana Ter. Combined with a fixed plate and studs is a lock plate, with circular slots adapted to engage the studs to hold the lock on the fixed plate, and projections on the rim of the lock plate engage one side of the bolt heads of the usual bolts, preventing the latter from turning. This invention has also been patented in Canada and in England.

MISCELLANEOUS INVENTIONS.

A vehicle spring attachment has been patented by Mr. Stephen M. Wier, of New Haven, Conn. The invention consists in yokes resting upon or suspended from the axles near the wheel bearings, with stirrups for receiving the ends of the springs, the stirrups capable of springing to permit of the elongation of the spring due to its compression.

An ironing table has been patented by Mr. Franklin P. Burcaw, of Hazleton, Pa. Its construction is such that the legs may be folded to have the device occupy only a small space when not in use, but the several connections are of such a character that when the table is opened and in position for use it will be perfectly steady and cannot accidentally collapse.

A drip trough for doors or windows has been patented by Mr. William W. Pitmon, of Waseca County, near Smith's Mill, Minn. The sill is made with a gutter or groove and a channel leading thence outward, a tube fitting at its inner end within the outer end of the channel, and having an outlet opening with a plug or knob.

A combined hook and clasp for horse collars has been patented by Mr. Louis T. Anderson, of Carroll, Iowa. The invention consists of a clasp made to be slipped upon the rim or front roll of a horse collar, with a tongue or hook stamped from the material of the clasp, making a cheap and convenient device for attaching sweat pads to the collars.

A wagon box lock has been patented by Mr. Nathan O. Calkins, of Elm Creek, Nebraska. It is for fastening an auxiliary wagon box on top of an ordinary one, and do away with the employment of slats and staples for such purpose, the lock consisting of a hook latch of peculiar construction and a retaining device for holding the latch in locked position.

A druggist's mortar has been patented by Mr. Edmund G. Purdy, of Ballston Spa, New York. It has one or more lugs projecting from its outer surface, and an annular frame is to be used therewith adapted to partly inclose the mortar, and having recesses for receiving the lugs, thus holding the mortar in a fixed position while in use.

A vehicle wheel has been patented by Mr. Robert A. Townsend, of Sibi, Beloochistan, India. The invention covers the application of an inclined plane at the hub to lengthen the radii of the wheel to compress the spokes, fellies, and rim, with tire jacks, operated by the spokes, to bridge the space between the fellies caused by the shrinkage of the latter.

A mouth harmonica has been patented by Mr. John F. Stratton, of Brooklyn, N. Y. It is to be played in the same manner as the mouth harmonicas now in general use, but is provided with an upper set of reeds, of which each reed forms a chord with the corresponding reed of the lower set, making a rich and harmonic tune when played, forming a duet.

An accordion has likewise been patented by the same inventor. It is constructed in accordance with the principle noted in the preceding invention, having an additional set of bass reeds tuned to a higher or lower pitch than the ordinary bass reeds, but in harmony therewith, so as to produce harmony in the accompaniment when the accordion is played.

A cider press has been patented by Mr. Hiram P. Latham, of Denver, Col. A series of rollers is journaled in a case, combined with which is a feeding device of a tube opening to the rollers at the side of the case, with a hopper, a conveyer screw rotating within the tube to force the substances to be ground to the rollers, and other novel features, the press being also adapted for pressing and grinding other substances.

A rinsing and drying device for dishes and other articles of table use has been patented by Mary Purvis, of Plainview, Minn. It is designed to be used after the dishes have been washed, when they are placed in particular places or on racks provided therefor within a case, in such way that hot water poured through an aperture into a pan in which the utensil stands will thoroughly rinse and quickly dry them.

A flour bolting reel has been patented by Mr. Francis E. McMaster, of Millburn, Pa. The reel is provided with external cloth flaps at one edge of its periphery, in combination with the bolt chest, the flaps to brush the outer face of the bolting cloth, and also brush the bolted material from the walls of the chest, the device being simple and inexpensive, while making the action of the reel more quick and effective.

A mattress has been patented by Mr. Karmell Brooks, of New York City. The invention provides a detachable strip of non-heat-conducting material to protect the top and bottom of the mattress, such material being of rubber or paper backed with linen or otherwise, or other suitable substance, whereby a thinner mattress may be used, and cold will not so readily penetrate it.

A pocket knife has been patented by Mr. Carl Hollweg, of Barmen, Prussia, Germany. The handle has side plates immovable with respect to each other, there being also a locking lug and outer independent handle, with other novel features, whereby the blades can all be independently opened and closed, or locked in position, without touching them, and no springs are employed.

A kindergarten game for teaching children has been patented by Imogen B. Oakley, of Pittsburg, Pa. Combined with a copy book having illustrated objects and their names in printed letters are detached cut or stamped letters made to form facsimiles of the printed letters in the book, the child forming the names or titles from the loose cut or stamped letters.

A gas burner has been patented by Mr. Josiah Burgess, of Zanesville, Ohio. It is principally designed to produce and burn gas from petroleum and its products, and for the burning of other gases, in laundries, coffee wasters, stove heaters, etc., providing means for vaporizing the oil supplied by a tank and distributing it through suitable burners in properly regulated amounts.

An improvement in folding furniture has been patented by Mr. Joseph B. Brolaski, of St. Louis, Mo. The invention covers especially the construction of an improved bureau, which may be easily knocked down and its parts closely packed, and in which the joints may be readily tightened or loosened in case of shrinkage or swelling of the different pieces, thus making each joint adjustable.

An adjustable coat holder has been patented by Mr. Hans Christian, of Vienna, Austria-Hungary. It consists of a single length of wire bent to form two sets of parallel bars, the ends of the wire being coiled at the inner ends of the bars to form hooks, in connection with shoulder supports that can be moved inward and outward to correspond to the width of the garment at the shoulders.

A device for converting motion has been patented by Mr. John W. Ledyard, of New York City. This invention covers a novel construction for converting reciprocating into rotary motion, which is designed to give more power with the same length of stroke, and so that the dead centers will be more easily and smoothly passed than when a crank is used in the ordinary way.

A wire cloth delivering reel has been patented by Mr. Silas E. Ratekin, of Kansas City, Mo. It has a vertical body and a vertical roll holder, with a horizontal pivot or shaft connecting the holder to the body, whereby the holder may be swung from a vertical to a horizontal position, a locking device upon the body engaging and holding the roll holder in either of its two positions, with various other novel features.

A pitman or pump rod has been patented by Mr. John F. Loomis, of Shelby, Iowa. It is designed especially for windmills, and the invention consists in the interposition of a spring or elastic cushion in the direction of its length, to render the rod elastic, and take up excessive strain and jar, causing a shorter stroke for the pump piston in proportion to the increased speed of the wheel.

A hair or mustache curler has been patented by Mr. Morris N. Posner, of New York City. The main body part of the device has a slot in one end, with a spring-pressed clamp bar mounted on the slotted end and normally pressed down thereon, to firmly hold the mustache or tuft of hair while it is being wound around the device, the spring clamp being readily lifted by pressing with the thumb on its rear end.

A vehicle tongue support has been patented by Mr. Alva N. Rooks, of Alpha, Mo. Two parallel and spaced semi-elliptical springs are pivoted to the under surface of the tongue, their inner ends bearing against the under side of the forward axle at each side of the king bolt, and so held adjustably that they will support the pole in any desired position, relieving the horse from such weight.

A road grader and leveler has been patented by Mr. John Skinner, of Newman, Ill. This invention covers an improvement on a former patented invention of the same inventor, providing a better method of elevating and lowering the framework carrying the harrow teeth and scraper, so that the machine can be easily supported at any desired height from the ground.

A coin or ticket receiving turnstile has been patented by Mr. Walter Peake, of New York City. The turnstile post has a cam and locking plate, combined with a locking dog and two pistons, one connected to the dog and the other acted upon directly by the cam, with other features, whereby the turnstile is operated only when a ticket, coin, or check, or other device, is dropped or pressed into the lock mechanism.

A washing machine has been patented by Mr. George W. Wilson, of Lanesborough, Minn. The tub has a false bottom, and secured to its side is a support for a lever designed to operate a pneumatic washing head or pounder in the tub, the action of which not only squeezes the clothes, but by pressure and suction forces air and water through them to quickly free them from dirt.

Saliva-proof mouth pieces for cigarettes form the subject of a patent issued to Mr. Joseph B. Underwood, of Fayetteville, N. C. The invention consists of a new method and machine to do work heretofore done by hand, the cigarette being made to rotate on its own axis in contact with a surface supplied with the material to be applied, such as paraffine, varnish, etc.

A horseshoe has been patented by Mr. Charles J. Le Roy, of St. Louis, Mo. It has a calk recess open at one end, with an independent calk fitting therein, there being a longitudinal groove between the calk and adjacent side of the calk recess, and the groove being enlarged and closed at its inner end, whereby a nail driven into the recess will have its point bent over or clinched against the closed end of the groove.

A photographic camera has been patented by Messrs. Nicholas Schroder and Edward G. Adams, of Brooklyn, N. Y. The patent provides for a construction whereby the front and back of the camera may be angled in various directions to adapt the focus to parts of the subject not lying in the same plane. An adjustable or sliding base frame may be dispensed with, while making a light and efficient camera and plate holder.

A device for swaging insertible saw teeth has been patented by Messrs. Nels H. Wheeler and Neil M. Newhouse, of Corvallis, Oregon. It is for restoring old and unserviceable teeth, the swage blocks being adjustable in relation to each other for the proper size of tooth, and firmly seated in a vise or socket, when the old tooth, at a cherry red heat, is placed in position, and, by the movement of a cam-headed lever, is drawn and swaged to the proper configuration at the point, receiving a roll temper.

A wheel and axle form the subject of a patent issued to Mr. Henry Q. Maurino, of Albuquerque, New Mexico. The invention provides a wheel on which the tire may be placed without heating, and tightened when necessary, there being devices for expanding the felly sections by endwise pressure of the spokes at the felly joints, with retaining washers or plates held at the faces of the wheel to overlap the ends of the spokes and the felly sections.

A machine for making paragon umbrellaribs has been patented by Mr. Daniel M. Redmond, of Philadelphia, Pa. It is designed to flatten, re-enforce, and perforate the ribs in continuous lengths, instead of in separate pieces, as has been heretofore done, in connection with a method of manufacture by which they will also be tempered, annealed, and tested in the operation, without the aid of skilled labor, the machine presenting many novel features of construction and arrangement of parts.

An adding machine has been patented by Mr. James Richardson, of Tarrytown, N. Y. It has two series of numbered wheels, a series of numbered keys, with means for imparting motion to the numbered wheels from the keys, mechanism for insuring the operation of the numbered wheels in succession and for returning the wheels and the wheel-moving mechanism to the point of starting, together with a registering and summing mechanism and a disk for registering the number of the addition.

An improved card clothed roller and a machine for making card clothing forms the subject of two patents issued to Mr. Ernst Gessner, of Aue, Saxony, Germany. A strip of card clothing having its rows of teeth set obliquely to its length is wound spirally on the roller so as to bring its rows of teeth parallel with the axis of the roller and the arms of the teeth in radial position, improving the working effect and enabling the teeth to better withstand the working strain. The machine patented is for making the card clothing with the card teeth set in rows arranged obliquely to the length of the band.

SCIENTIFIC AMERICAN BUILDING EDITION.

JULY NUMBER.

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4. An Attractive Residence at Providence, Rhode Island, with perspective and plans. Cost, Five Thousand Five Hundred Dollars.
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NEW BOOKS AND PUBLICATIONS.

McCARTY'S ANNUAL STATISTICIAN. 1887. Pp. 650. San Francisco, Cal.: L. P. McCarty.

This is the eleventh edition of Mr. McCarty's work, each issue being more full and complete than its predecessor. It is a sort of *omnium gatherum* of matters pertaining to history, politics, geography, and trade, with much curious and useful information not classifiable under either of these headings, and to a large circle of readers cannot fail to fill a valuable place as a ready reference book.

IMPROVED PLUMBING APPLIANCES. By J. Pickering Putnam. Pp. 129; 94 illustrations. New York: William T. Comstock.

This book treats only of lavatories, including wash basins, bath tubs, and kitchen and pantry sinks, together with water closets, traps, and waste pipes. It presents forcibly the need of the best work in plumbing, with all the work so constructed that inspection will be easy, and urges the need of greater simplicity than has lately obtained in the fittings adopted in some of our more expensive dwellings. Illustrations are given of some of the latest patterns of water closet flushing arrangements, but the writer, who is an archi-

tect, and has developed a special device of his own of this kind, naturally argues strongly in favor of his own device.

THE CONVERSION OF HEAT INTO WORK. By William Anderson. London: Whittaker & Co. New York: D. Van Nostrand.

The simple and direct but extremely interesting way in which an ordinarily complicated subject is here presented will doubtless render this book of exceptional value to young mechanics who know little of the theoretical side of their business, and to other students who have to "dig out" their education from books, without the aid of teachers. Although now published as a practical handbook on heat engines, it contains but little matter in addition to that which appeared in the original form in which it was published, as lectures before the Society of Arts and Manufactures, London, which were printed in six successive numbers of the SCIENTIFIC AMERICAN SUPPLEMENT in the latter part of 1885.

A HISTORY OF SALT LAKE CITY AND ITS FOUNDERS. Salt Lake City, Utah: Edward W. Tullidge.

This is a handsome octavo volume of nearly 1,100 pages, profusely illustrated with fine steel engravings of the principal Mormon notables from 1840 to the present time, with biographical sketches. It is in fact a history of Mormonism and its growth and development in Utah, written by "authority of the Council and under supervision of its Committee on Revision," and therefore giving a picture of Mormonism in the most favorable light in which it is possible to present the institution to the public. There are too many outside evidences of material prosperity and thrift everywhere to be seen in the resourceful valley where the Mormon emigrants from Illinois and Missouri began to make their home in July, 1847, and the vitality of the community has been too plainly manifested on many occasions, for any one easily to escape the conclusion that the "Mormon question," as it is called, is still one of no insignificant importance. It is no part of our purpose to discuss the matter, but just why and how it has become of such material significance is probably more fully explained in this volume than in any other one work published.

The British Guiana Directory for 1887, published by C. K. Jardine, Demerara, cannot fail to be a valuable aid to such of our merchants and manufacturers as are seeking to extend trade in that exceedingly fertile and resourceful tract of 600,000 square miles lying just under the equator, on the northeast coast of South America. The book gives full details of all departments of the little government, with classified directory for the principal trades in different cities, the prominent country estates, etc.

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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.
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Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(1) W. M. L. writes: 1. In building an eight light dynamo as illustrated in SCIENTIFIC AMERICAN, April 23 and 30, can I substitute brass instead of bronze for making sleeve A, flange B, and cylinder E, Fig. 6 (SCIENTIFIC AMERICAN, April 30), also for yoke-holding shaft, or only make cylinder E of bronze and the rest of brass. A. Brass may be used, but bronze is preferred on account of its hardness and durability. 2. Does it make any difference in the winding of the field magnet whether I wind both posts right or left handed, or should they be wound different? A. Wind so that if placed endways the direction would be uniform. Both must be wound either right or left handed. 3. How can I attach machine to wooden base? A. Drill and tap the polar extremities, and insert tap bolts through the wooden base. 4. What is the best wood to use for the armature core? A. Well seasoned mahogany or maple. 5. What are the wedges made of that are use for dividing the coils on the armature? A. Hard rubber, vulcanized fiber, hard wood, or bone.

(2) R. T. asks: In regard to pumping cold water into a boiler when the water is low and the flues heated, is it not the gas that is generated in coming in contact with the hot iron that causes an explosion? A. It is dangerous to pump cold or hot water into a boiler with the line of water below the top flues; at such times the flues out of water may become red hot, as also the sides of the boiler above the water. Pumping up the boiler at such times largely increases the generation of steam, possibly carrying the pressure up to the point of rupture. The theory that explosions are thus caused by gas formation is in no way sustained.

(3) C. H. D. & Co. ask the ingredients of a solution in which to steep burlap or jute bags in order to make them more durable when used for transporting acid fertilizers, such as dissolved phosphate rock. A. Plunge the bagging into a solution, at 142° Fah., and leave for an hour, the solution consisting of sulphate of alumina 2¼ pounds, water 5½ gallons, and borate of lime 2¼ pounds. The borate of lime is added after the sulphate of alumina has dissolved, and the whole decanted when settled. After taking out of this bath, the textiles are put into a second bath, composed of 2¼ pounds resinous soap and 2¼ pounds Marseilles soap dissolved in 5½ gallons water and carried to the boiling point. At the end of ten minutes the bags are allowed to drip, are next dried, and then rewashed and dried. Bagging made in this way, it is claimed, will resist the action of acids or chemicals.

(4) E. T. H. asks how to make a mahogany stain for wood, and a varnish to coat it to represent a polish. A. The following is a dark stain: Boil ½ pound of madder and 2 ounces logwood chips in a gallon of water, and brush over while hot; when dry, go over the whole with a pearl ash solution, 2 drachms to the quart. Or put 2 ounces dragon's blood, bruised, into a quart of oil of turpentine, let the bottle stand in a warm place, shake frequently, and when dissolved, steep the work in the mixture. To polish, take a piece of pumice stone and water, and pass repeatedly over the work until the rising of the grain is cut down. Then take powdered tripoli and boiled linseed oil, and polish the work to a bright surface.

(5) H. W. F. asks: 1. What cement, either liquidor otherwise, can I use to mend china so as to hold hot substances, and the cement to be transparent or white? A. See article on cements in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, for this information. 2. How is oak finished as "antique oak"? Is it possible to do over oak furniture so that it will be antique? A. By intensifying the stain, the oak can be made to resemble the antique article. New furniture restained has that appearance. 3. What is the cause of the "gapes" in chickens, etc., and what can be used to prevent and cure it? A. Camphor pills, it is said, will cure this disease. Sulphur is also used. 4. How do you multiply hyacinth bulbs? A. They multiply from the small bulbs which form at the base of the large ones.

(6) H. A. L. and others.—Your question has been many times answered. Try and look a little more closely into the exact terms of the problem. No part of the periphery of a wheel of a wagon moving along a road travels faster around its axis than another part. The axis moves along the road with the mean speed of the top and bottom of the wheel. The top of the wheel moves twice as fast as the wagon. *Per contra*, the periphery of the wheel is during one half of its revolution gaining, and during the other half losing speed, as compared with the forward motion of wagon and axle, so that the bottom of the wheel, or part in contact with the ground, does not move in a measurement of this onward movement.—A snake climbs a tree that is small enough to allow of its peculiar manipulation, by a spiral movement around the trunk or a return bending of its coils nearly half way around, by which the snake obtains a grip. Their favorite trees are the kind that have low limbs, which give them a natural rest.—For the manufacture of steel see back numbers of SCIENTIFIC AMERICAN SUPPLEMENT.

(7) W. J. B. writes: Referring to article in SCIENTIFIC AMERICAN, April 23, 1887, upon eight light dynamo, will you please inform us through your paper: 1. What size of wire and how many layers to wind upon field magnet to make a plain series machine of it, using but one strand for conductor? A. Use eight layers of No. 12 (Am. W. G.) wire on each leg of the magnet. 2. What changes will be required to make it operate 12 standard 16 candle power lamps instead of 8? A. Put coarser wire on the armature, say No. 18, and increase the speed, and increase all of the dimensions of the machine about 20 per cent.

(8) P. S. asks: How many gallons of water per hour will a 3 inch pipe line 7,000 feet long deliver into a tank, the point of delivery being 38 feet above ground and the head of water being 13 feet higher than point of delivery? A. 1,400 gallons per hour.

(9) R. F. asks how large to make a balloon and of what material, to lift 5 pounds. A. You will require a globular balloon of 7½ feet diameter when filled with the carbureted hydrogen of your gas works to lift 5 pounds and the weight of the balloon of say 2 pounds. For material use strong tissue paper or Chinese silk well varnished with rubber varnish. See Balloon Making, SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 249, 413.

(10) G. K G. asks: What will remove bicycle oil from corduroy without leaving a stain? A. Use ether or a mixture of ether and ammonia. Apply in a circle all around the stain, and sponge off the spot last of all.

(11) H. K. asks (1) the most practical method for making brass signs. A. Use nitric acid to eat into the metal. 2. How to permanently blacken the letters and scroll work? A. Mix asphaltum, brown japan, and lampblack into a putty-like mass, and then fill in the spaces, finally cleaning the edges with turpentine.

(12) S. O. N. writes: We have a driven well about 25 feet deep, with seven feet of water in it, but it does not pump easy. We think the point is in clay, and we cannot turn the pipe in ground Can you suggest a way to make the water flow more freely—like exploding a dynamite cartridge in it? A. The pipe should either be drawn up so as to allow the strainer to receive the surface water lying upon the clay, or be driven deeper, to reach the next sand stratum, which may give a better supply. It will be of no service to torpedo the well in the clay. Besides, your point should have a strainer which precludes the use of a torpedo without first withdrawing the tube. Better drive deeper and find what is below the clay.

(13) J. J. asks the best way to tin tempered steel (small pieces) with a smooth thin coating without injuring temper or getting too hard. I have first cleaned the pieces in a hot solution of potash, then put them in diluted muriatic acid and then in zinc acid, before going into the tin, but cannot get them smooth and even. A. Your manuipulation appears to be right, only that the surfaces should have a half polish or be quite smooth. Also the tin bath should have a clean surface, which can be made by sprinkling a little powdered sal ammoniac upon the surface and skimming. Have the tin pretty hot and draw the pieces slowly out of the tin.

(14) E. P. asks: How are photographs on boxwood obtained? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 428, page 6830, also No. 584, page 9320.

(15) C. E. E. asks how to make an enamel on steel, one that will dry quick and black. A. Use japan varnish and bake in an oven at 250° temperature.

(16) J. M. L. asks what to put in common coal tar to make it adhere to iron better than it does when simply boiled, and then applied. A. Mix with pulverized plumbago or lampblack. Thin with benzine if necessary. If color is no object, use Prince's metallic paint.

(17) H. S. sends a plant to be named, and asks whether it has any medicinal properties. A. The plant is a species of elder, *Sambucus glauca*. Its medicinal properties, if it has any, are probably the same as those of the eastern species, the flowers of which have been reported diaphoretic and discutient, the berries aperient and sudorific, the bark purgative, and, in small doses, diobstruent.

(18) W. S. asks: What is the greatest height at which a siphon will work, and the largest pipe that can be used therefor? A. There is no limit to the capacity of a pipe for a siphon. The greatest height depends upon the pressure of the air. It may be 33 feet, practically 28 to 30 feet.

(19) G. S. D. asks how hair clippers are ground or sharpened, whether on flat surface or between the teeth, and what is used to sharpen them with. A. Never sharpen the clippers on the flat side. Always on the bevel side. Use Washita or Arkansas stone and oil. You can buy the stone in long sticks, ½ inch diameter, through the hardware trade.

(20) P. & S. ask as to the feasibility of running an upright shaft direct from engine, through a six story building and connecting with it shafts on each floor by gearing. A. Vertical driving shafts in mills are only to be tolerated as a necessity, or as turbine shafts. The step of a long vertical shaft is a source of constant trouble, which added to the noise has about driven the system from present mechanical practice.

(21) H. M. D.—Six inch copper pipe may be bent to a radius of 3 or 4 feet by filling, after annealing, with resin. Allow the resin to cool, and bend slightly over a curved block of wood hollowed out, so that the pipe will bear half way round to keep it from flattening. Bend a little, then melt the resin out and anneal again. You may have to do this two or three times.

(22) F. E. writes: I wish to make a wire rheostat with resistance of 3,000 ohms, divided into 10 divisions or more—or 15. What size wire will I have to use to put 200 ohms resistance in each coil, and how much to each coil? Also give same with 300 ohms resistance to each coil. A. Of No. 35 German silver wire, one pound gives about 8,136 ohms resistance. Therefore one twenty-seventh pound will give you about 300 ohms, and one fortieth pound will give about 200 ohms. The exact resistance of each coil has to be determined experimentally. One pound of No. 40 wire gives about 41,248 ohms, so much less of this, about one-fifth the above amounts, would answer.

(23) C. H. G. wishes further directions about making a kite without a tail, such as was described in SUPPLEMENT, No. 595. A. The directions for making the bow, which you do not seem to understand, read: "The bow . . . consists of two pieces of osier, each 5½ units in length, that form, through their union, a total length of 7 units." This simply means that the two ends of the osier that are to form the center of the bow should be lapped over each other to a sufficient extent to make the entire length of the bow when the two pieces are joined seven-tenths the length of the central stick.

(24) G. C. H. asks: 1. What is the best steel for making compass needles, and what temper will they require before magnetization, and what is the best shape to make them? A. Use cast steel, hardened and drawn to a purple. The straight bar form is probably the best. 2. Would a heavy coiled flat spring, say ¼ inch thick and 6 inches wide and 20 feet long, be eight times as strong as one one-sixteenth inch thick, 3 inches wide, and the same length as the first? A. It would be more than eight times as strong. 3. Will the lighter spring lift 150 pounds? A. You have left out the element of time and distance. It will lift 150 pounds if connected with the weight by suitable mechanism.

(25) D. M. G. writes: In the article "Inexpensive Arc Lamp," in the June 11, 1887, number, what kind of a battery can be used? Will a telegraph battery answer, and how many? Where can I get the carbons, in Cleveland? A. It will require from 25 to 50 Grove or Bunsen cells. The ordinary telegraph battery will not answer. You can get carbons from any house dealing in electrical materials.

(26) J. D. McC. asks: 1. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, article on induction coils, what is the object gained by having the secondary coil in two sections, with insulating resin between them? A. The construction in sections is for the purpose of more effectually separating those layers of the coil having the greatest differences of potential, so as to prevent sparks jumping across and destroying the insulating material. 2. Is there any good reason for preferring naked wire to silk-covered wire, except its greater cheapness? A. Naked wire lies closer and is cheaper than covered wire; no other reason exists for its employment.

(27) O. R. asks: 1. What is a good glue to use in making camera bellows? Ordinary glue becomes hard and the rubber cloth breaks. A. Use rubber cement. See "Cements," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158. 2. A developing formula in which quinol is used in place of pyro? A. You probably refer to the hydroquinone developer. The formula is as follows: A. Water 80 cubic centimeters, hydroquinone 1 to 2 grammes. B. Saturated solution of carbonate of ammonia in water. To 8 parts of A add 1 part of B.

(28) W. D. B. S. asks: 1. Is there any difference in the lifting power of an elevator rope or ropes when the rope is passed through an eye, and the two ends attached to the drum, and when the rope is separated and attached in two places on the crosshead of the elevator, the ropes being all of one size? A. There is no difference. 2. What is the strain on a rope that two men are pulling on, one at each end, supposing one pulls 200 pounds one way, and the other pulls 200 the other way? A. The strain is 200 pounds.

(29) B. P. G. writes: About four years ago a young man in this place boiled a hen's egg and put it away. On breaking it open the other day, he found that everything in it had shrunk to a mass about one-twentieth the size of the egg, almost perfectly egg shaped. It looks like a piece of amber, being most beautifully translucent. A. The white of eggs contains about 85 per cent of water and 12 percent of albumen. By boiling, the albumen is coagulated, but without much if any loss of water. By lapse of time the water gradually evaporates, and the result spoken of was probably due to this evaporation.

(30) Subscriber asks: Has it been definitely ascertained yet what caused the sinking of the Oregon? A. It was caused by collision with a vessel believed to be a coal schooner.

(31) W. S. asks: Does the brake of a car wheel when set up so as to nearly but not quite cause the wheel to slide, stop a train quicker than when the wheel slides? A. Yes. If the wheel is kept from rotating, the part in contact with the rail becomes polished and slides easily. If allowed to slowly turn, a new surface is continually presented to the rail. The latter practice stops the car quicker.

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