RECENTLY PATENTED INVENTIONS.

Mechanical.

MECHANISM FOR OPERATING ROLLERS.—Jules Richard, Paris, France. According to this invention, there is a loose roller on each of two shafts, a spring movable on each shaft being adapted to be pressed into engagement with the rollers, while a reciprocal cam plate alternately engages and disengages the springs, the mechanism being adapted for operating rolls on which ribbons, aprons, etc., are wound, and rendering it possible to adjust the parts so that when the ribbon or apron is being moved in one direction it will be impossible to accidentally move it in the wrong direction.

COLORING OR COATING PAPER.—Louis Dejonge, Jr., Stapleton, N. Y. This is an improvement on a formerly patented invention of the same inventor, providing a machine for coloring or coating paper and like material, and making provision on the cylinder of the machine for sheets of any size, the adjustment of the bed receiving the sheets being quickly and conveniently made, improved grippers being adapted to hold the paper on the bed. The invention also simplifies the devices for elevating the paper and holding it in position until caught by the clips of the drying machine used in connection with the coloring and coating machine.

POWER SLED.—Joseph, William H., and Moses C. Runnoe, Crested Butte, Col. This invention provides a self-propelling sled, carrying a motor, and one which may be driven over snow and ice with sufficient power to haul or carry a load, being provided with easy means of steering. Its driving mechanism is adjustable to suit varying depths and conditions of snow, and it has an improved snow plow adapted to discharge the snow to either or both sides. It is also adjustable vertically to enable it to scoop the snow to any desired depth.

Agricultural.

CULTIVATOR AND WEED CUTTER.—Alfred J. Morley, Chula Vista, Cal. This is a machine having readily removable cultivator teeth or shovels, so shaped as not only to cultivate the ground but to throw the earth, assisted by the teeth supports, toward the center of the machine or to the outside. The frame constitutes substantially a continuous plate, directing the loosened soil over to the rear and insuring the breaking of ground not acted on by the teeth or shovels. The machine acts also as a pulverizer and leveler, the frame smoothing over the loosened soil, and a comb finally treating the surface over which the machine is passed.

FERTILIZER DISTRIBUTER. — Monroe Morse, Medway, Mass. This is a machine adapted to distribute fertilizer in drills as readily and as accurately as broadcast, the extent to which the material is scattered being conveniently regulated. It has distributing hoppers adjustable to and from each other, each having a valve-controlled opening and the valves being capable of rotary or vertical movement, and the driving shaft is made in telescopic sections, to be lengthened or shortened according to the spacing of the hoppers. The machine is inexpensive and durable, and is not liable to clog.

SAUSAGE FILLING MACHINE. — Richard W. Seideman, Marysville, Montana. This is a self-feeding machine, to be operated by hand or power, and when operated by hand one person furnishes the power while the other places the casings in position and removes the filled casings. The casings are placed on tubular supports attached to a wheel, a number of casings being placed in position while one is being filled. The operation is conducted in a continuous manner, and air is not forced in with the meat.

Miscellaneous.

TOE CLIP FOR VELOCIPEDES.—Samuel L. Ruden, New York City. A superior toe clip for the pedals of these machines is obtained by this inventor by means of a U-shaped plate pivotally mounted and adapted to have one arm engaged by the sole of the rider's foot, the remaining arm being drawn down upon the toe of the user.

HORSE HITCHING DEVICE.—Uriah E. Miller and Paul Barringer, Heilig, N. C. This is a simple device adapted as a substitute for the ordinary hitching strap, the wheels of the vehicle being readily locked and the locking mechanism being connected with the driving lines of the harness, the arrangement being such that the animal will be prevented from moving the vehicle forward or backward. The more the animal draws on the hitching straps, the firmer they are locked.

BRANDING CIGARS.—Paul Gebhard, New Haven, Conn. To brand cigars with a name or emblem and at the same time cut the cigar to the desired length, this inventor provides a device comprising two hinged sections with a cigar-receiving groove in one section and a type groove and movable plates in the other section, there being a set screw for each plate. A graduated gage for regulating the length of the cigar is adjusted by a set screw, and a knife in each section cuts the cigar to the proper length at the same time that the type characters make an impression on the wrapper.

PRICE SCALE. — Harry Fisher, Neoga, Ill. This invention consists principally of a movable point of connection between the weighing beam and the weighing frame, thus forming a computing scale to give the value of an article at a given price per pound or other unit, the price being varied by the operator manipulating the scale. A movable weight automatically preserves the balance of the beam through all changes of the connection between the weighing beam and the weighing frame.

CONVERTIBLE TABLE AND KIT CASE.—William E. Baxter, Frankfort, Ky. Two patents have been granted this inventor for a foldable construction to serve as a box or case for the papers of an army officer or to inclose the utensils of a kit with table legs and braces, or as a flat or grass table or an elevated table. Sufficient space is afforded for the storage of coffee pot, bucket and other necessary articles of a well equipped camp kit, and the invention covers a novel construction, combination and arrangement of parts.

FIRE EXTINGUISHING APPARATUS.—Elias K. Driver, Lufkin, Texas. This is an apparatus more especially designed for use in gin mills, saw mills, factories, etc., and is arranged to enable an attendant to quickly turn on water or steam to extinguish flames in or outside the building. A valved supply pipe is connected with the steam boiler, and branch pipes extend vertically therefrom within and outside of the building, discharge nozzles being flexibly connected with the branch pipes, and the discharge nozzles being under the control of the operator to direct streams as desired.

FENCE.—Robert S. Sayre, Talladega, Ala. This inventor has devised a portable panel fence of simple and inexpensive construction and which is light, strong and durable. The rail forming the body of the trestle for other parts of the panel is preferably an undressed tree trunk, to which are removably secured diverging legs adapted to slightly enter the ground, while vertical perforations receive braced standards connected by fence wires or wooden strips. The fence sections may be readily loaded on a wagon to be taken from place to place.

WIRE FENCE.—Ross Phillis, Springfield, Ohio. This invention provides novel braces or stay pieces for the wires comprising the fence, and affords reliable means for securing the fence wires on supporting posts, permitting expansion and contraction of the wires and the taking up of slackness. The fence wires are prevented from being moved up or down or lengthwise when pressed against by animals, and the stays or rods may be removed at will without injury to the fence wires.

SPORTSMAN'S FLY CASE. — Daniel K. Howe, Portland, Oregon. A case for carrying fly hooks and leaders and also adapted to serve as a pocket flask for liquid refreshment has been devised by this inventor. The casing has at one end a metal cap suitable for use as a drinking cup, and a liquid proof partition divides the casing into a number of chambers adapted to receive flies, sinkers, etc., and hold them without liability to damage, but so as to be readily removable. The lower end of the casing consists of a small reservoir or chamber provided with a screw cap.

COLLAR.—George S. Elliott, Bar Harbor, Me. This is a standing collar made with a necktie retainer, consisting of a tape secured at its ends to the collar to form a loop. The tape is extended longitudinally of the collar underneath one of the end buttonholes and the necktie end is passed vertically through the loop before completing the knot.

BUSINESS DIRECTORY.—John D. Browning, Louisville, Ky. This is a telephone list and business directory combined, comprising a novel arrangement of sheets or boards with names of subscribers in alphabetical order, with the names of other parties following various occupations, as indicated on the margins, the directory affording a convenient and ready reference to parties carrying on different kinds of business.

DESIGN FOR MIRROR FRAME.—Albert Wanner, Jr., Hoboken, N. J. This frame has legs in the form of foliated scrolls, which are continued around the outer border of the frame, and combined in a central line to form lyrelike figures.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

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.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(6812) D. B. K. says: Will you kindly give me recipe for making a good leather cement, suitable for fastening small leather belts? A. Take of common glue and gelatine, equal parts; place them in a boiler and add water sufficient to just cover the whole. Let it soak ten hours, then bring the whole to a boiling heat, and add pure tannin until the whole becomes ropy or appears like the white of eggs. Apply it warm. Buff the grain off the leather where it is to be cemented; rub the joint surfaces solidly together, let it dry a few hours, and it is ready for practical use; and if properly put together, it will not need riveting, as the cement is nearly of the same nature as the leather itself.

(6813) W. H. S. says: By accident I tore a good rubber coat. How can I mend same? A. Cement for sticking on patches and for attaching rubber soles to boots and shoes is prepared from virgin or native India rubber, by cutting with a proper solvent. We advise you to use rubber bicycle tire cement. Apply a coating to the outside of the surface on each side of the tear and to one side of the piece of rubber fabric to be used for mending. After an hour's exposure, give a second coating and let them stand over night. Then place the edges of the tear accurately together and apply the patch, so that the coated surfaces come together. Press well together and the repair is made. Rubber cement depends for its action on the cohesive power of pure rubber surfaces—it operates entirely differently from a true cement. Strictly speaking, it should not be called a cement.

(6814) W. B. B. writes: 1. Please inform me through your paper how the connections are made to get the waste current from an electric railroad track. I saw the account of it in your paper, but have lost the paper. A. Sometimes by connecting one wire to the water pipe and the other to the gas pipe, current may be obtained. There is no fixed method. 2. Could I make a Crookes tube with an incandescent lamp globe? A. The vacuum is insufficient generally for X ray work, which is very exacting. 3. How many dry cells would it take to operate it with an induction coil? A. From twenty upward; the induction coil must be large enough to give at least a 2 inch spark.

(6815) M. W. C. writes: Will you answer the following problem in your columns? Prove that $x+\frac{1}{2}y=\pi$, if

$$\frac{\sin y}{1-\cos y}+\frac{\cos x}{\sin x}=0.$$

A. From circular functions we have

$$\frac{\sin y}{1-\cos y}=\cot \tfrac{1}{2}y$$

and, also,

$$\frac{\cos x}{\sin x}=-\cot x.$$

We also know that the cotangent of the supplement of an arc = −cotangent of the arc. Therefore, since

$$\cot \tfrac{1}{2}y=-\cot x$$
$$x+\tfrac{1}{2}y=180°=2\pi.$$

(6816) B. S. B. says: Will you please tell me how to make a waterproof glue for sticking paper, etc.? I would like it to be colorless and mix very thin. A. In order to render glue insoluble in water, even hot water, it is only necessary, when dissolving the glue for use, to add a little potassium bichromate to the water and to expose the glued part to light. The proportion of potassium bichromate will vary with circumstances; but for most purposes about one-fiftieth of the amount of the dry glue used will suffice. In other words, glue containing potassium bichromate, when exposed to the light, becomes insoluble.

(6817) L. A. M. says: Can you tell how to whitewash brick walls so that it will stick well? A. For brickwork, especially where exposed to damp, take half a peck of well burned quicklime, fresh from the kiln, slake with hot water sufficient to reduce it to a paste, and pass it through a fine sieve; add a gallon of clean white salt which has been dissolved in a small quantity of boiling water, and a thin, smooth paste, also hot, made from 1 pound of fine rice flour; also ¼ of a pound of the best white glue, made in the water bath. Mix, stir well, add ¼ of a pound of the best Spanish whiting in 5 quarts of boiling water; stir, cover to retain heat and exclude dust, and let it stand a week. Heat to boiling, stir, and apply hot. The above proportions will cover forty square yards.

(6818) S. A. S., Texas, asks: Would a gasoline engine compressing its volume 15 per cent produce as much power as one compressing it 30 per cent? Why? What is the strongest metal for its weight? A. Compressing the gas and air mixture in a gas engine produces quicker combustion and greater explosive pressure. A 30 per cent compression will produce more power than a 15 per cent compression, but there is probably a limit to the economy of compression by its increasing the negative pressure. The relative volumes of gas and air also have a controlling effect in compression gas engines. One part gas to six parts air gives the highest efficiency in the higher compression, probably up to three atmospheres. The heat of compression also favors rapid and perfect combustion. Aluminum and steel are of equal strength in ratio of their weight. A small percentage of copper in aluminum increases its tensile strength in proportion to its weight.

(6819) W. R. says: How are the yellow or light spots on the wrapper of a cigar produced? Of course not those that are of natural, but of artificial origin. I have heard it is done by sprinkling the tobacco leaves with a kind of acidous liquid, that will not destroy the texture of the leaf. A. We have not this information at hand. Perhaps some of our readers may be able to inform us.

(6820) G. E. M. asks how to arrive at the number of kilowatts in the case of an electric train requiring 200 amperes for 20 hours per day, with voltage at 500. A. 200 amperes × 500 volts gives 100,000 watts, or 100 kilowatts. The hours per day has nothing to do with the problem.

(6821) J. D C. asks: What would be the number of turns of No. 18 copper wire to use with 1½ pounds No. 36 wire, to get the longest spark with a Rhumkorf coil? That is, I want to know the proportion. I already have the 1½ pounds No. 36 wire, and want to know how much No. 18 to use for the primary. Does the absence of a condenser reduce the length of the spark very much? A. The general principle is, that the more primary you use, the longer will be the spark, because the length of the spark will be greater, as there are more turns in the primary wire. Try one pound of wire for the primary; this will give you about 200 feet, enough for 600 to 1000 turns. The omission of a condenser will seriously impair the operation and will diminish the length of spark. See our SUPPLEMENT, No. 160, for a small induction coil.

(6822) R. W. P. writes: 1. The C. G. S. unit of current strength is defined thus: "A current has unit strength when one centimeter length of its circuit bent into an arc of one centimeter radius (so as to be always one centimeter away from the magnet pole) exerts a force of one dyne on a magnet pole placed at the center." My question is, does it make any difference what the diameter of the magnet pole is? And if it does, what should its diameter be, its thickness I mean? Of course only a geometrical point would be placed at the center. A. The magnet pole is supposed to be a point or equivalent thereto. 2. Unit difference of potential exists between two points when it requires the expenditure of one erg of work to bring a unit of + electricity from one point to the other against the electric force. The volt being 10^8 of these units, it becomes important for me to know how to tell whether, in any given case, the unit difference of potential (as just defined) exists or not. In actual practice, such as would be necessary in the derivation of the volt, how is the difference of potential determined in these absolute units? A. For absolute measments very sensitive instruments are used. The various types of electrometers give potential determinations with accuracy. You will find the subject well presented in Ayrton's "Practical Electricity," $2.50 by mail, with numerous examples of apparatus both of electrometer and of galvanometer type. Emptage on "Magnetism," $2.25 by mail, gives excellent treatment of the subject of your first query. For higher mathematical treatment we refer you to Foster & Atkinson's "Elementary Treatise on Electricity and Magnetism," price $2.25 by mail.

(6823) R P. B. asks: 1. Is the ordinary calcium carbide dangerous to handle? If so, how can I handle it in safety? A. Carbide of calcium is perfectly safe to handle if no water comes in contact with it. 2. Can it be put into an airtight vessel with small opening in which there is placed an outlet or jet for the consumption of the gas generated therein? A. To preserve it, use an airtight vessel with no outlet. The outlet will simply cause it to decompose. 3. In what issue was the apparatus for generating the gas in, for illuminating purposes? Also numbers describing the properties of the gas and other general information relating thereto. A. For several standard apparatus we refer you to the SCIENTIFIC AMERICAN SUPPLEMENT, No. 1057; other papers are in the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 998, 1004, 1007, 1012, 1014, 1015, 1016, 1035, and 1038, price 10 cents each, mailed.

(6824) M. E. S. says: Will you kindly tell me how to mix soap suds for making bubbles? I have been told there are other ingredients necessary besides the soap and water, to bring them to lasting perfection. A. For soap bubble solution the best material is pure oleate of soda. Oleic acid as sold in the shops is far from reliable, containing one or more other fatty acids, such as stearic acid. To make the pure acid, 2 ounces of pure soap (almond oil is the best, but Castile will answer) are dissolved in 20 ounces of boiling water. One ounce of sulphuric acid, previously diluted with 2 ounces water and allowed to cool, is added. The fatty acids rise to the surface in an oily layer. The water is siphoned off, and they are washed three times with boiling water. The mass is allowed to cool, and is removed from the surface of the water, where it floats. It is weighed, mixed with ⅛ its weight of litharge, and heated (212° to 225° Fah.) until complete combination is effected. This may be known by the cessation of any evolution of bubbles from the mass. The resulting lead plaster is allowed to stand mixed with 10 to 15 times its weight of ether in a tightly corked bottle, until completely disintegrated. Then it is filtered, and to the filtrate hydrochloric acid is added as long as any lead is precipitated. The ethereal solution is poured off, and the ether recovered by distillation, leaving pure oleic acid. Two fl. drm. of the acid is added to somewhat less than 1 pint of boiling water, and solution of caustic soda very carefully added, drop by drop, until complete solution of the acid is effected, very carefully avoiding an excess of soda, and after cooling, water is added to make it measure 1 pint. A standard soap solution is thus obtained. To this add ⅛ its bulk of the best glycerine (Scheering & Glatz's, or Price's). Shake long and well, and the mixture is ready for use. For additional bubble mixtures and interesting experiments on soap bubbles, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 160, 495, 563, 579, 654.

(6825) W. K. W. writes: 1. The saving of copper is very great in three-wire system of electric lighting, but I notice it is rarely, if ever, used in insulated plants. Can you tell me the reason for this? A. There is no reason why this system should not be used by authorized parties. There is an economy in copper for lamps of specified voltage, but not for a given maximum voltage in the system. 2. Are 220 volt lamps used in this system or 110? A. About 110 volts is the rule in this country. 3. How can arc lamps be run on incandescent circuit? A. By using a resistance coil in circuit with each lamp. See our SUPPLEMENT, No. 955. 4. Do you think that a good knowledge of steam engineering can be got from a school of correspondence? A. A good theoretical knowledge, which would make the practical part very much easier to obtain—for it is necessary to have practical experience.

(6826) J. L. O. writes: 1. I have access to a 10 light dynamo, the current of which can be passed through the body without being felt, unless the machine is out of order. A. The dynamo is so well constructed that it gives but little extra current, owing to the absence of sudden changes in E.M.F. A steady voltage has little effect on the body. 2. Please explain the principles of an alternating current dynamo or motor. Is it stronger than direct, and, if so, why? A. Our SUPPLEMENT and back numbers of the SCIENTIFIC AMERICAN explain alternating current dynamos and motors. They are neither stronger nor weaker than direct current. You will find Leyden jars described in any work on physics.

(6827) G. S. asks: What is the cheapest (and the longest life) battery or batteries for operating motor 641; Can No. 20 on the armature and No. 18 on the fields be used for the same? Can you give me some information regarding electric motors actuated by alternating currents? Can a motor (small one) be driven from the secondary of an induction coil—a very powerful one? If so, how and why? A. The secondary or storage battery is the best for driving motors. A bichromate battery, such as described in our SUPPLEMENT, No. 792, can be used. Many secondary batteries are described in our SUPPLEMENT, Nos. 641 and 838 and others. For information about alternating current motors we refer you to our SUPPLEMENT, Nos. 601, 653, 692, 717, 763, 822, 944, and 1025. The numbers of wire specified can be used on the motor. The secondary of an induction coil cannot be used, except experimentally, to drive a motor. A special motor should be used, and it would give very slight power.

(6828) W. C. Van N. asks: 1. What is the law for determining the size of wire to be used in induction coils? A. The primary is made large enough to take the current it is proposed to use. There is no other fixed rule. 2. Is the voltage of a secondary coil in an induction coil increased by using finer wire, if the length remains the same? A. No; the voltage depends on the ratio between the turns in primary and secondary.