

RECENTLY PATENTED INVENTIONS.

Engineering.

STEAM CYLINDER.—Charles F. Hinrichs and Joel C. Barker, Poplar Bluff, Mo. The cylinder, according to this invention, consists of a split tube or casing, with longitudinal and end flanges, with a groove or recess, and a lining or shell fitting in the casing, where it may be tightly clamped and held from turning, but which can be readily removed when worn out and another substituted in its place, without necessitating the reboring of the cylinder. It is designed in practice to furnish one new lining and an extra set of piston rings with each cylinder, so that a worn or damaged cylinder may be quickly repaired.

PACKING EXTRACTOR.—Addison Goodrich, Astoria, Oregon. This is a device for quickly and easily taking out the worn-out packings from stuffing boxes without removing or injuring the rod or stem. It consists of a screw-threaded bushing made in sections and adapted to be placed in the stuffing box, one section having tongues and the other having grooves, while there is an annular packing groove in its head and an annular inwardly projecting flange at its bottom for supporting the packing.

Railway Appliances.

SWITCH DEVICE FOR CARS.—James M. Pickell, Lake City, Fla. This is an attachment capable of ready application to the dash board of a street car, where it may be operated by either the hand or foot of the driver, or the operator of a cable or electric car, to move the frog of a switch without having to stop the car. A spring-actuated rod having a horizontal curved shoe at its lower end is held to slide in a casing, the rod terminating at its upper end in a crank, with means for guiding the rod vertically and laterally, whereby the shoe may be turned as desired, while it will when released return to its normal position, the oscillations of the car not interfering with its efficiency.

Mechanical Appliances.

GIN SAW GUARD.—Wiley S. Killingsworth, Laurens, S. C. Separate grooved guard fingers are mounted rigidly upon the cross bar of the framework below the saws, and extend up around their lower portion, covering the periphery of the saws between the gin ribs and the brush at the lower side of the saws to protect the hand and arm of the operator from being accidentally cut by the saws. The fingers are cheaply made of cast iron, and are applicable to all gins, one being applied to each individual saw.

HORSESHOE BLANKS.—John F. Robinson, Rockaway, N. J. This invention provides a machine for the forming of these blanks in series from a hot bar of iron or steel. It is a machine having two revolvable rolls on a housing frame, each roll having a series of horseshoe mould half sections on it, and adapted to mate in pairs, the bottom half section of each mould having sockets to form toe and heel calks on the blanks, with knife dies to sever the blanks. As the rolls are rotated toward each other the metal is forced into the moulds and crowded into the cavities, producing the calks, creases, and nail hole marks on each blank, which is cut off as it is formed.

SPOKE TENONS.—Jefferson M. Sherman, Brushton, N. Y. This invention covers an improvement in machines for turning tenons on wheel spokes, especially the spokes of carriage wheels. It consists of two aligning pairs of jaws connected by spring bars, one pair of jaws being adapted to hold a spoke and the opposite pair being hinged together and provided with a locking device, while also carrying a revolvable cutter head and suitable feed mechanism. The machine is of simple construction and easily operated and is designed to turn the tenons rapidly and accurately.

SPLIT SPINDLES.—Charles E. Soderberg, Worcester, Mass. Heretofore these spindles for weaving shuttles have been made by welding two strips of steel, the body and point previous to welding being rolled half round on each piece, the spindle being liable to overheating, causing waste, and the weld when not exact causing splitting of the spindle throughout. The invention provides an improved method of making the spindle from a single piece of stock, by first punching or otherwise forming a slot in the spindle blank, and then rolling or hammering the blank by suitable machinery to form the spindle body.

Miscellaneous.

SCALPING AND BOLTING FLOUR.—John Metherell, Murfreesborough, Tenn. This invention provides an improved apparatus for scalping, re-scalping, and bolting the flour from wheat or other grain after granulating, to render pure flour and perfect separation of the various stocks simultaneously. The machine has a plurality of bolting reels arranged one within the other and supported to revolve independently, whereby the reels may be moved at different speeds and in opposite directions, the mechanism for revolving adjacent reels in opposite directions being so arranged that the stock may be bolted from one reel upon a clear portion of the next outer reel, with other novel features. The machine is designed to effectively accomplish a classification of grades in succession, and keep its grades pure from beginning to finish.

GUN CARRIAGE BRAKE.—Adolf T. Resow, Essen, Germany. This is a self-acting brake for traveling gun carriages, the invention covering a mechanism whereby the brake blocks are brought automatically into and out of contact with the wheel tires of field and other guns, the movements of the carriage wheels being thereby controlled. A three-armed lever is mounted in a slidable bearing, one arm being connected with the brake block and another arm adapted to engage the hub of the wheel, while a lever mechanism tilts the third arm for adjusting a sliding block. The brakes are automatically applied as the carriage runs back after a discharge, and released when the gun is again to be brought into position.

AMALGAMATOR.—Thomas Shannon, Whitewood, South Dakota. This is an improved mercury amalgamator, in which the amalgamating vessel has a false bottom, with cross slats forming spaces for the quicksilver and amalgam. The bottom is removable, when it is desired to withdraw the amalgamated mercury and precious mineral, being held in place by retaining bars which extend above it and are secured by screws turned through the amalgamating vessel from the outside. The agitator or stirrer is supported to turn in the amalgamating vessel, and has arms above the mercury line to disintegrate the pulp rising through the mercury to separate its particles and insure the deposit of practically all the gold and silver.

TWO WHEELED VEHICLE.—John F. Barrows, Saginaw, Mich. This is a vehicle specially designed for carrying organs, upright pianos, sewing machines, furniture, etc., to permit of easily loading and unloading the articles, which are made to ride very easily. At the rear of the axle, between the wheels, is a frame with upright bars connected with the vehicle body, horizontal arms extending from the lower ends of the bars and connected by a board on which is held an adjustable cushioned arm to lock the article in place. By connecting the axle rigidly with the springs and the latter with the shafts, the jogging motion usual to ordinary road carts is overcome and the vehicle runs smoothly.

LAMP.—Charles H. Van Hise, New York City. This invention relates to oil-burning lamps for lighting streets, the lamp containing means for self-extinguishment at a predetermined time, these devices being also readily applied to portable lamps for use in the house. A sleeve and thimble envelop the wick tube, while a deflector plate and tube-enclosing device may be simultaneously moved toward or from each other by a mechanism provided, there being a hollow float in the oil chamber carrying a standard with a thumb piece and series of pins spaced to represent intervals of time. A rocking tripping bar, to one end of which a gravity block is loosely secured, is raised by the falling of the float throwing the extinguishing mechanism into closed adjustment.

ICE PICK, SHAVER AND SCOOP.—Frederick K. Kaiser, Wilmington, Del. In this combination implement the hand bar or blade is made with a pick point, behind which is held a scoop body formed with a cutting edge, there being a gauge plate at the pick blade next its point to control the depth of cut of the forward end of the scoop, which has a detachable cover with catch or latch devices. The implement may also be used for loosening and handling any caked or granulated substance.

STOVE DRUM AND DAMPER.—Thomas Power, Portland, North Dakota. This drum is in the shape of an inverted cone, and is preferably about the length of one joint of stove pipe, being placed in position on the stove by taking off the lower joint of pipe that bears against the stove collar and replacing it with the drum. In connection with the drum a tubular damper is provided, of the stove pipe section, by means of which the heat may be more or less confined for utilization in the drum for warming and cooking various articles of food, thereby adding to the cooking capacity of the stove, while the draught will be all the time under complete control.

SCRATCH OR MATTING BRUSH.—Stephen D. Engle, Hazleton, Pa. This is a revolving brush wheel for jewelers and engravers, with tufts of glass fiber or spun glass arranged at suitable distances apart around and secured within its hub. The ends of the tufts repeatedly strike the metal they are used on, and such a brush wheel is designed to always preserve sharp cutting ends on the glass fibers instead of blunting, while they will not corrode or become bent out of shape, to cause them to drag on the work and make scratches instead of pits. These brushes are designed to wear longer and act on harder surfaces than either the hinged or unhinged metallic bristles.

SKID FOR PILING BARRELS, ETC.—James C. Boyle, Omaha, Neb. This invention provides a sectionally constructed plank or series of skids, being fractional portions of a plank of novel construction, to facilitate the piling up of tierces, barrels, and other like packages in any number of tiers. The skids are each made of an upper board and a leg piece shaped to fit down in between each two adjacent barrels in the same tier, the leg piece tapering on its sides to hug closely the barrels and keep the top board at its proper height and level. In use a number of these skids are first arranged on the lower tier, and as the barrels are rolled to place, the skids are successively removed to be replaced on the barrels above for another tier.

CIGAR FILLER MACHINE.—Thomas Hancock and Lee B. Hancock, Richmond, Va. By this machine the tobacco is pressed into suitably shaped bunches, which are cut at proper lengths for the filler of the cigar and ready for the binder. On a suitable frame or table is journaled a revolving feed table with an annular pocket, and tobacco of proper lengths is laid on the supporting table, radially to the axis of the feed table; over a portion of the pocket projects a former or bunching housing of glass, or of metal with sight openings, there being at the discharge end a cutter operated by a gravity dog or pawl engaged by radial projections on the revolving table. The table is fed around in short intermittent movements, and the machine may also be used for making cigarettes, cheroots, etc.

CIGAR OR PIPE HOLDER.—James Skuce, Truesdell, Wis. This device has two tube sections connected at right angles with a lower parallel tube, forming a central drop tube between its mouth end and the outer end, the drop tube being so constructed as to arrest and condense the nicotine and other volatile matters, while the holder has a sufficiently long smoke passage to insure the cooling of the smoke before it reaches the mouth of the smoker. The parts may be readily taken apart for cleaning and easily put together. The outer end of the device is adapted to receive a cigar holder or the stem of a pipe.

BUNKER COVER FASTENER.—John S. Farlow, Philadelphia, Pa. Combined with a cover plate, in a nut mounted centrally in which a post is held to move perpendicularly, is a screw mechanism for moving the post, on opposite sides of which are pivoted levers having their outer ends arranged to extend beyond the edge of the cover plate while their inner ends are loosely secured to the post. The fastening may be used to secure any cover or hatch in place, but is more especially designed for the bunker covers and scupper hatches of sea-going vessels, so that they shall be water-tight, notwithstanding the wave concussions and shifting of coal in the bunker.

COVER.—Hasbrouck Alliger, Rondout, N. Y. This is a removable cover for condensed milk cans, cups, tumblers, etc., and is adapted to be moved laterally to open or close the receptacle. The device consists of a semicircular clip or band of spring metal adapted to be conveniently clasped about the glass or other vessel near its top, and having an upwardly extending eye on which the lid is pivotally connected to the band by a pin, there being a washer interposed between the eye of the clip and the lid, while the lid has a knob extension opposite its pivotal point for convenience in moving it to either side.

INCUBATOR.—George W. Murphy & Co., Quincy, Ill. are the patentees of an incubator which was described as follows in a previous issue: The invention provides a novel construction designed to facilitate the automatic regulation of the temperature of the incubator by means of a balance thermometer and other peculiar features, and whereby a constant and perfect circulation of water in the heating chamber is obtained. The body of the incubator is made impervious to moisture and cold, and the trays are so made that the heat will reach almost the whole surface of the eggs, the position of the latter being changed expeditiously and conveniently, without liability to breakage. The pans for the interior of the hatching chamber are designed to absorb any surplus of moisture, while also serving to direct the heat in currents to the trays.

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SEPTEMBER NUMBER.—(No. 71.)

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12. View of the new court house for Los Angeles, Cal., now being erected at a cost of \$750,000. Architects Messrs. Carlett, Eisen & Culbertson, of Los Angeles.
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16. Miscellaneous contents: Schimper's artificial fuel.—Cement for parchment paper.—Forcing tea roses.—The exclusion of rats and mice from dwellings.—A thoroughly fireproof roof, illustrated.—Steam pipe required for heating.—Fine hard wood staircase and hall work, illustrated.—A new sash pulley, illustrated.—A new hand tool for sheet iron workers, illustrated.—Venetian blinds.—East India roofs.—Granite in architecture.—The "Iron-clad" range boiler, illustrated.—A help for the infirm, illustrated.

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Notes & Queries

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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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Minerals sent for examination should be distinctly marked or labeled.

(3341) W. S. asks (1) for an Aristo toning bath that the paper will not curl in. A. Try soaking in a mixture of alcohol and glycerine before developing. 2. A recipe for a good cheap chewing gum. A. Mix paraffin with a very little olive oil and glycerine by melting. Vary proportions to suit climate. 3. A recipe for making extract of lemon. A. Partially dry 4 ounces outside rind of lemons, pound in a mortar, agitate with 2 quarts deodorized alcohol until color is extracted, add 6 ounces recent oil of lemon, agitating and filtering after standing some days. 4. A receipt for extract of ginger? A. Pack 4 ounces ginger in a percolator, moisten with alcohol, percolate until 1 $\frac{1}{2}$ pints have passed, add 8 ounces sirup. 5. A recipe for dissolving gold for photo purposes? A. Dissolve in hydrochloric acid to which nitric acid is added from time to time. After solution evaporate nearly to dryness and dissolve in water. 6. A recipe for making chocolate sirup that will keep for a long time. A. Mix 8 ounces chocolate with 2 pints water, stir, and warm over a slow fire. Strain, and add 4 pounds white sugar.

(3342) W. H. K. writes: There is a number of tables in different works which claim to give the degrees of heat at which different metals fuse; they differ very much in statement. Can you inform me by what means this is ascertained? Is there a special instrument made for the purpose? If so what is its name and where procured? A. Pyrometers of various construction have been applied to determining melting points of metals. The high degree determinations are not to be considered perfectly accurate. The instruments can be obtained from dealers in scientific apparatus. The determinations require a high degree of skill.

(3343) F. L. asks: 1. How can I produce a viscous or mucous fermentation of sugar? A. Procure the proper culture germ from a sample already in the mucous fermentation. Inoculate the sugar solution therewith. 2. Would the same process work with starch? A. This must be tried. It possibly may work, although a sugar is the proper basis for this ferment to work upon.

(3344) D. H. asks: Is there any known process by which eggs can be preserved and packed so they will keep fresh and good for weeks or months, at any season of the year? A. Eggs are now indefinitely preserved in a fresh state in cold storage room, where they can be kept at a low temperature, about 40° Fah. Egg packing liquid is made as follows: Lime 1 bushel (slaked with water), common salt 2 or 3 pounds, cream of tartar $\frac{1}{4}$ pound, water q. s. to form a mixture

strong enough to float an egg. Used to preserve eggs, which it is said it will do for two years, by simply keeping them in it. But we have not tested the process.

(3345) A. W. writes: I want to make a frame with a strong cloth fastened around it, about 3 feet by 4 feet, so I can use it to sketch on with chalk, colored or black, and afterward wash it off clean with a sponge. Glass ground is liable to break, and a board that wide cannot be had here, and would be heavy. I have been using common cheap muslin, and getting it washed after, and using it over again. Cannot cloth (muslin) be prepared in some way as to be used for the above purpose like a blackboard, but white? A. You can prepare cloth like a blackboard by several coats of paint, rubbing down between times with ground pumice. As a final coat use white lead mixed with enough ground pumice to give a "tooth" to the cloth. Or you may use shellac varnish mixed with Chinese white and ground pumice as the final coat.

(3346) J. E. E.—Gutta percha is made to adhere and act as cement by means of heat. One of the most convenient ways of using it is to place a thin sheet of the percha between the surfaces to be joined, and then apply heat by means of a hot pressing iron, applied on the back of the leather until the heat strikes through and melts the percha. This is the mode used by tailors in cementing leather and cloth to cloth. Thin sheet percha is on the market for this purpose. Another method is to dissolve the gutta percha in bisulphide of carbon. Apply the solution to the surfaces to be joined. Let dry. Then place the coated surfaces together and apply heat as before described until the gutta percha is melted and the part thereby cemented together.

(3347) L. H. W. asks: What can I get to wash over stone that is perishing, crumbling away, rubs off like sand? It is Ohio sandstone. Also what kind of cement can I get that will fasten on corners and slivers knocked off, so that they will stay and not attract attention? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 526, for illustrated account of the preserving process for the obelisk and discussion on preservation of stone, brick, etc.

- Cement for sandstone;
- Dry clean fine sand.....20 parts.
- Litharge.....2 "
- Pulverized lime.....1 "
- Mix with boiled linseed oil to a thick paste.

Plaster of Paris colored with any dry paints to a suitable color then quickly wet to a paste and applied makes a good cement where not exposed to the weather.

(3348) I. A. L. says: I see in the SCIENTIFIC AMERICAN, No. 8, August 22, that "oak timber loses about one-fifth of its weight in seasoning and about one-third its weight in becoming dry." Are drying and seasoning different things? Please explain. A. Lumber, when only seasoned or air-dried, is not free from moisture. There is a further loss of moisture and weight by thoroughly drying by heat.

(3349) J. S. L. says: I am running a light locomotive. Can I divide the lead of the valve while it is being run very slowly in this manner: Have the lead openings marked on the valve stem, then take a divider and mark the center of the distance between the two marks? Would the valve be made to cut off true if the eccentric rod was lengthened or shortened as the case may require, so that the valve will travel as far beyond the center mark one way as the other? A. Your method of finding an error in length of connecting rod is correct.

(3350) J. O. says: Will you let me know whether you can drive a pipe two inches in diameter for a well twenty feet deep with a sledge, and if you strike a stone, will you please let me know what to do? A. Yes, you can drive 20 feet with a sledge with a hickory block on the drive cap. Well pipes should be driven with a wooden maul or drop; hickory or locust is best. If stopped by a stone, pull up and start a little way off. A steel cap is good to strike on. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 107, on methods of driving well pipes.

(3351) G. J. L. asks: 1. How can I remove the size from one corner of a piece of paper without discoloration of the same? A. Wet the size with a soft sponge, and after it becomes thoroughly dissolved apply a piece of blotting paper to absorb it. Repeat the operation if necessary. 2. I have built an electric motor according to SUPPLEMENT, Nos. 161 and 599, but it does not work, and I am going to build a new armature. What size wire should I wind the armature with to make a motor to run a sewing machine? A. The motor, as described, should run a sewing machine with a current from four cells of a large plunging battery.

(3352) J. G. asks: 1. What should the dimensions of a boiler for a small engine (nearly 1 horse power) be for running the 8 light dynamo with incandescent lamps? Will No. 16 or 18 galvanized iron answer for this boiler? Should the dynamo be connected up in shunt or series? A. Your boiler should have 20 square feet of heating surface. For small boiler construction for amateurs see SCIENTIFIC AMERICAN SUPPLEMENT, No. 702, with illustrations and dimensions. Galvanized iron is not suitable for steam boilers. Not less than three-sixteenths iron should be used for a 1 1/2 horse power boiler shell. Connect the dynamos in series, as shown in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600.

(3353) E. K. H. asks how to mend meerschaum, or how it can be glued. A. Casein cement is recommended for this purpose. Boil fresh cheese in water until it is rosy. Dissolve it in water glass or solution of silicate of sodium, stir into it calcined magnesia and use at once. Use equal weights of cheese and water glass solution, and as much magnesia as will mix with it.

(3354) W. S. writes: I have been copper plating the ends of carbon plates for bichromate battery and have washed them well with clean water, but after a short time sulphate of copper has formed on them and broken the soldered connections. What is the cause and prevention of this? A. To pre-

vent the battery solution from acting upon the copper film deposited on the carbon, you will need to paraffin the end of the carbon, that is to say, you should heat the carbon and rub on paraffin until the extreme end of the carbon is saturated. You can electroplate on this and solder your connections to the electroplated surface.

(3355) F. E. C. asks with what to coat stoneware jars where glazing is defective, to render them airtight for preserving purposes. A. Heat the jars to a temperature of boiling water, or a little hotter if possible, and rub paraffin all over the unglazed spots until they have absorbed as much as possible. It is tasteless and harmless, and may be put on inside and outside of the jars to make sure of the jars being airtight.

(3356) R. C. B. asks how to make the best kind of a battery for an electric bell. A. There is nothing better for an open circuit electric bell than the Leclanche battery. You will find this described in SUPPLEMENT, No. 159, also in "Experimental Science."

(3357) W. E. F. asks how to clean and brighten small brass work to be lacquered. Have tried different mixtures of acids, but do not get good results. The acid will either not clean or the work will tarnish (turn black) immediately on taking from the running water. A. The brass must be thoroughly cleaned from grease or dirt before dipping, by boiling in strong caustic soda water; wash in hot water, then dip. We do not know of a better mixture than equal parts of nitric and sulphuric acids, with half a part of muriatic. Dip but a few seconds and immediately plunge the brass in boiling hot water and dry quickly. Cold water will not clear the acid from the porous metal. We recommend to you Butt's "Tinman's Manual," \$1.25 mailed, which has a variety of receipts for dipping metals.

(3358) T. J. asks for recipes for some cheap wash that will protect a wall plastered with common mortar against the effect of rain and consequently from frost. How will skim milk with lime or cement do? How about the solutions of oxide of zinc and chloride of zinc? Would a wash with Portland cement be sufficient? A. Whitewash used on United States public works: 3/4 bushel best lime slaked with boiling water, 1 peck salt dissolved in warm water, 3 pounds ground rice boiled to a thin paste, 1/2 pound ground whiting, and 1 pound clear glue dissolved in warm water. Mix all together, add hot water for proper use, and let stand for several days. Then heat and apply with large brushes. Chloride and oxide of zinc are good but expensive. Portland cement makes a fair brown wash. Skim milk may be used with cement and zinc oxides.

(3359) W. J. U. says: I contemplate building, for a shallow crooked river, a steamboat 65 feet long by 16 feet beam, maximum draught when loaded 2 feet (current 2 1/4 miles per hour); have been advised to put in a single engine to operate four 2 feet propeller wheels by bevel friction, each wheel to be reversed or stopped with engine always going one way. Do you think this will be as good a plan as the ordinary double engine and stern wheel of the river boats? If so, what power should be used to make a speed of 12 miles per hour? A. We do not advise the four small screws for your boat. They are difficult to connect properly, and bevel friction is not suitable or reliable for operating propeller screws, and gearing is too noisy. You will need at least 35 horse power. We recommend a stern wheel with two engines. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 398, 217, for illustrations of stern wheel steamers.

(3360) J. H. L. asks: Is it the best to shut up all doors and windows or let as much air get in as possible during electric storms? A. We think the better plan is to close all doors and windows, as a column of warm air issuing from the house would facilitate the passage of the electric discharge.

(3361) W. A. A.—The insect is the common mole cricket, *Gryllotalpa borealis*.

(3362) E. W.—Nigrosine is a coal tar color prepared from the hydrochloride of violanine. This product is variously modified in the process of manufacture several shades, varying from blue through bluish gray to gray, violet to black, this last being called nigrosine, are produced. Other names for the various other shades are violanine, elberfeld blue, bengaline, aniline gray, Confier's blue, etc.

(3363) J. C. M.—See SCIENTIFIC AMERICAN SUPPLEMENT, No. 51, on the manufacture of zinc white; carbonate of barite is used to adulterate both zinc white and white lead. Chemical analysis is the only sure test.

(3364) G. H., Jr. asks: 1. Why is the rising moon red? A. Because of the absorption of the more refrangible rays of light by the great distance that the moon's rays pass through the atmosphere at rising or setting, aided by the hygrometric condition of the air, the water in the atmosphere probably being the most active agent of absorption. The midday sun looks red as seen from a considerable depth in water. Divers notice this peculiarity. 2. Where is the largest marble cutting establishment in the world? The largest marble works are near Rutland, Vermont. 3. I have a copper bath tub which is coated with tin or zinc. This bright coating has worn off in places and the copper turned black. Is there any way in which I can recast these injured places? A. You can do nothing better than to keep the bath tub clean by polishing with sapollo, or with oxalic acid. You cannot retin the bare spots.

(3365) J. F. M. asks: What is the inclosed powder? It is used in the porous cup of a battery. A. The powder is principally or entirely potassium nitrate, common saltpeter. In the porous cup mixed with dilute sulphuric acid it supplies free nitric acid as a depolarizer.

(3366) W. W. B. asks: 1. What chemicals and in what proportion, added to water, will extinguish fire? A. Most alkaline salts dissolved in sufficient quantity in water act as extinguishers. Sulphate of sodium is excellent. Bicarbonate of ammonium is good, as yielding a certain amount of carbonic acid gas.

2. How can a photographic plate be developed a positive? A. This has not been done except experimentally. No practically successful process is known. Several investigators are now working on the problem. 3. Explain E.M.F., which so often appears in these columns. A. Electromotive force, or the difference of potential which is the cause of a current of electricity. It is produced by batteries and dynamos in general practice.

TO INVENTORS.

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