RECENTLY PATENTED INVENTIONS.

Engineering.

COMPOUND GAS ENGINE.—Edward R. Bales, Centralia, Ill. This engine is designed to reduce vibration to a minimum, to run with a comparatively small flywheel, and to utilize the motive agent to the fullest extent. It has two high pressure cylinders, their working strokes alternating, discharging into a receiver, and a low pressure cylinder having valved communication with the receiver, the low pressure cylinder being driven alternately by the exhaust gases from the high pressure cylinders. The arrangement is such that a continuous impulse is given to the main driving shaft while the engine is at work, and all parts are so completely counterbalanced that there is but little vibration.

SLOW COMBUSTION FURNACE.—August Pampus, Kiel, Germany. This furnace has a fire box with two passages in its opposite walls, one passage having a series of apertures conducting the draught upward and into the fire box and the other passage having apertures conducting the draught downward from the upper portion of the fire box into the lower part. The air is thus conducted along the whole column of fuel in such a manner that the gases are completely saturated therewith, causing an energetic production of heat and increasing the capacity of the apparatus. The invention is designed for use with stoves as well as boiler furnaces.

Railway Appliances.

CAR BRAKE.—Benjamin Jay Cobb, Shreveport, La. According to this invention the brake beams and complementary parts are raised above or level with the axles of the wheels, that persons lying on the track may not be struck by the car passing over them. A lever extends vertically adjacent to the inner side of each wheel and carries at its lower end a brake shoe, beams connecting the levers in pairs, while additional levers are connected to the beams. A link connects the additional levers with each other, and means are provided for applying power to one of the levers, the shoes swinging away from the wheels when the levers are not positively actuated.

TURNTABLE.—Gabriel Rohrbach, Del Rio, Texas. This invention relates to an improvement on a formerly patented invention of the same inventor, comprising an operating device consisting of clutch dogs adapted to engage a circular rail, a vertical shaft carrying a horizontal bar engaged at opposite ends to the clutch dogs, links connected to the clutch dogs by which their angular position may be changed, and a lever for operating the links. There are spring connections between the levers and links, and means for oscillating the vertical shaft, a long leverage being used when the turntable is started and a short leverage after it is under way.

RAILROAD RAIL.—Alexander J. Gordon, Philadelphia, Pa. For especial use for street surface cars, this rail is arranged to permit of conveniently replacing its worn-out head without disturbing the base and webbed portions and the pavement in which these parts are embedded. With this idea the base has a web formed at its upper end with a fork between the members of which is fitted a depending flange of the head, the flange having at its lower edge notches for the bolts of stay rods formed at their ends with bolts passing through the fork, thereby fastening the flange of the head in place in the fork of the base.

Electrical.

CALL BOX SYSTEM.—William T. Budds, Charleston, S. C. In wiring between a main office alarm and a series of operating call boxes, this invention provides a system whereby, should the metallic circuit be broken or grounded, the alarm may still be turned in from any one of the boxes. A break may be quickly located, without an expert lineman, by sending a messenger to ring in the several call boxes, none of which are put out of connection with the main office. A motor operates a circuit controlling wheel on one side of which is a segmental block of insulating material, a metallic plate on the block being insulated from the body of the wheel, while brushes normally resting on the plate have connection with line wires and a ground wire has connection with the body of the wheel.

Bicycles, Etc.

BICYCLE ALARM.—Fred B. Sanders, North Bend, Pa. According to this invention a spring-pressed lever clipped to the under side of the handle bar may be pressed up to force downward a rod at whose lower end is journaled a friction wheel, bringing such wheel in contact with the tire, the shaft of the friction wheel also carrying the wings of a blower inclosed in a casing provided with a whistle. Normally the spring-pressed lever holds the friction wheel out of contact with the tire, but when such lever is drawn up under or at the side of the handle bar, the friction wheel engages the tire and causes the wings of the blower to be rotated, thus sounding the whistle as long as the lever is so pressed upon.

Miscellaneous.

AMALGAMATOR.—Julius Jean, Globeville, Col. For separating the precious metals, as gold and silver, from their ores, this invention provides an apparatus designed to make such separation practically complete and which may be operated with comparatively little labor. It comprises a frame mounted to slide on rods at its corners and to be raised by a cross head and screw, an inclined trough, copper-lined, extending longitudinally through the frame, there being a comb at its discharge end, while below this trough is a second trough having a depression for mercury, there being a receiving trough below, and a funnel supported by the frame within a box.

WIRE STRETCHER.—William T. McNeill, Stoneburg, Texas. This stretcher has a body portion shaped to embrace a post, and in which is fulcrumed a lever adjustably connected with an angular pull bar, while a clasp consisting of a body bar, and having a lug and cam, is connected with the pull bar, there being a projection from the body to which is attached a second clasp, both clasps being reversible. By this device the wire may be quickly and conveniently placed under any desired tension and so held as long as desired, or the device may be utilized for drawing the ends of a broken wire together, or the ends of opposing wires, that they may be brought together and connected under tension.

HOOF SPREADER.—Philip De Loria, Lake Placid, N. Y. This device comprises a screw adapted to be mounted loosely in the toe of a horse's hoof, a block bearing against the inner side of the toe of the shoe having an eye loosely receiving the screw, there being an arm pivoted to each end of the block, the arms being extended rearward and adapted to engage the quarters of the hoof, while a crosshead threaded on the screw has sliding connection with the arms. As the screw is turned in the hoof, the crosshead is moved forward and backward, and the spreading pressure on the quarters may be regulated to cure the hoof of abnormal contraction.

MILK PAIL STRAINER.—Angus D. McLellan, Crystal, North Dakota. To prevent extraneous impurities from dropping into the milk during the milking operation, the cover of the pail, according to this invention, is made with a central opening surrounded by a metallic flange, there being over such opening a sieve, at one end of which is a plate to receive impurities. Within the flange is a casing communicating by a perpendicular tube with a funnel through which the milk is received, one end of the casing being inclined or beveled to direct the milk at an inclination against the sieve and throw the impurities upon the plate.

SAFETY ENVELOPE.—Ruth N. Smith, Patchogue, N. Y. The blank for this envelope has two foldable end flaps on which are locking tabs that may engage slots in the flaps, and two side flaps, one of which is adapted for side folding and has a keeper band produced by two spaced slots, while the opposite flap is narrowed toward the free end, on which is a lateral locking tab, the tab and the neck of the flap being adapted to pass below the keeper band when the envelope is folded, and the lateral tab to be interlocked with a single slot in the front side of the envelope. The envelope is formed of a single sheet, and is designed primarily as a closure for letters, but may be made as a safety cover of thin sheet metal, such as light tin or aluminum, for the preservation of valuable documents.

SALES SLIP ENVELOPE.—William De Witt Bates, Grafton, N. D. To render the use of sales slips more convenient and reduce their cost, this envelope is made of ordinary manila paper and entirely closed except for a narrow transverse slot across the face near one end, through which the end of the slip projects, the envelope being also provided with a carbonized or copying surface upon the inner surface, while it may likewise have a record blank upon its back. The envelopes cost so little that they may be thrown away after the original slip has been used, thus providing a fresh copying surface for each slip and insuring clearer and better copies, while preventing all handling of the carbon sheet and obviating the soiling of the fingers thereby.

RAISIN SEEDER.—Cary S. Cox, Fresno, Cal. This device has a carrying roll consisting of a shaft on which are disks having teeth inclined opposite the direction of motion, and a pressure roll having an elastic surface engaging the teeth, there being reciprocating strippers between the toothed disks, and a blade adjustable to and from the teeth of the carrying roll to receive seed from the teeth.

OINTMENT APPLICATOR.—Eugene A. Bagby, Winchester, Ky. This invention covers a pipe for conveniently applying pastes, oils, etc., internally, the pipe having external grooves and inclosing flexible sheath forming receptacles for the substance, the sheath being inflatable.

FIGURE TOY.—William F. Simon, West Hoboken, N. J. This is a toy to be made in imitation of a reptile or snake, having its body formed of a spirally coiled thin metal strip, crimped to present a contrast of light and shade. Any metal suitable for the purpose may be used, either in its natural color or with artificially produced colors or shades.

Designs.

WALL PAPER.—Arthur Martin, Paris, France. The leading feature of this design is a shield with scroll extensions and bearing a panel decorated with interlocked horns. Foliate branches extend from the border through the members of the shields, and groups of fruit apparently extend from the foliage of the stems, interlocking floral branches. Another wall paper design of the same inventor simulates a growing plant of pinks, with rich groupings of the stems and flowers, forming a chain of plants. A still further design, forming the subject of an additional patent, comprises a festooned crescent shaped garland with floral and ribbon sections, bouquets being tied at the extremities of the garland, with a centerpiece between the bouquets and over the center of the garland.

WIRE STRETCHING TOOL.—James L. Cates, Senatobia, Miss. This design is for a tool with straight handle section, having at one end a fork and at the other end a yoke body and claw.

BURNER FOR LANTERNS.—James W. Dearing, Brooklyn, N. Y. This burner has arms extending upward from a base surrounding the burner tube, the arms being of T-shape and having serrations in the upper edge of their horizontal head portions.

BOX.—Simon Weiller, New York City. This box is of cylindrical form, having disk caps and ornamental bands or panels around the body of the box adjacent thereto, while a central panel bears a decoration simulating wound braid.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 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.

(7302) W. S. O. asks: 1. What office does the segmental commutator on an alternating dynamo perform? A. In a composite field alternator one winding on the field is in series with the line and armature circuit. The segmental commutator is introduced in this field circuit, and it rectifies the current only in the field circuit. Sometimes the field circuit is shunted so that only part of the current is rectified. This causes the machine to act like a compound wound direct current machine, in which the strength of field, and therefore the voltage, depends upon the current in the outside circuit. 2. Does it change a portion of the current into a pulsating current when it is shunted off through the field to assist in exciting the field? A. It changes a part of the current, which helps to magnetize the field and thus increase the voltage to account for loss in armature and line. 3. If the entire current from an alternator were commutated into a pulsating current, would the current not be as efficient to transform, and also have the advantage of being adaptable for direct current motors? A. It would not be as efficient to transform, as you would have to use rotary transformers to vary the voltage. In all direct current machines the currents generated are alternating and rectified by the commutator. 4. Has there yet been built a practical machine to generate direct current that can be taken from the machine through ordinary collector rings? Thus dispensing with the commutator. A. No.

(7303) W. H. S. asks: 1. Can a telescope be used with a kodak for taking the picture of an object some distance away? If so, how distant an object (as a person) could be taken in this way? A. Yes; the size of the picture depends on the size of the telescope. With a small telescope it would be minute. The difficulties would be great, due to vibration of telescope and long exposure required. 2. How should they be arranged together, the kodak and telescope? A. Take out the eyepiece of telescope and lens of camera, and fit the opening into camera where the lens was upon end of telescope, where eyepiece was. Then focus object upon ground glass of camera as in the ordinary way. You have, you see, a long camera. The object lens of telescope is now the camera lens. 3. How can lantern slides be made from negatives, provided one has camera? A. Lantern slides are very often made without a camera by contact method. A good book on slide making is by D. L. Elmendorf, price $1 by mail. 4. Can a reducing or enlarging camera be made from a kodak? A. No; the bellows of a kodak is too short for the purpose, and in all good enlarging cameras the lens is in the middle, with a bellows on each side of it. The negative is at one end, the plate holder is at the other. With some ingenuity and mechanical skill, a copying camera can be made from an ordinary camera. Set the lens out on an extension tube, and put a light-tight wooden box on the end of the lens to hold the negative.

(7304) J. B. asks: 1. Is the action in ordinary gravity batteries identical with that in the electroplating bath? A. So far as coating the copper plate with copper goes, the action is the same. The action in the upper part of the battery jar upon the zinc is not like that in a plating bath. 2. What becomes of the zinc? A. The zinc combines with sulphuric acid to form zinc sulphate. This appears as a white crystal on the sides of the jar above the liquid. 3. What is that accumulation on the copper? That brown sediment in bottom of jar? A. Copper is deposited on the copper and copper oxide is the brown sediment. 4. Why is blue vitriol necessary? A. It prevents the polarization of the copper plate. 5. When the sounder lever is held stationary, the signals can still be heard in a very subdued click. Explain this. A. That is because you do not really hold the lever still. If it did not move at all, there would be no sound. Permit us to advise you to read carefully some elementary text book of electricity and to perform all the experiments you can manage to do with the tools and materials at your command. If there is a high school in your place, the teacher will doubtless be glad to advise you. Any very elementary book will explain the batteries and their action. Avery's "School Physics" is a very good one.

(7305) A. C. M. asks: 1. Can the fields of the small alternating current dynamo described in SCIENTIFIC AMERICAN, September 11, be wound with No. 20 wire to be used as a shunt? If so, please explain how to wind. A. The field of the alternator cannot be connected in shunt with the armature, but constitutes a separate circuit which must be excited by a battery or a direct current from lighting circuit. No. 20 copper wire should be used on the fields, wound as directed in the paper. 2. I have the No. 20 wire for field, and if I cannot use it as a shunt, how should it be wound to use primary battery, and what amount of battery will it require? A. Use 5 to 8 cells of battery to excite the field, Edison-Lalande or bichromate.

(7306) G. B. writes: I am building an alternating dynamo as described in the SCIENTIFIC AMERICAN of September 11, 1897. Would like to know whether the size of wire given in the paper would do to use in case I would want to excite the machine by batteries. If not, would like to know the size of wire necessary, also the number of turns of same and the most suitable battery to excite same with. A. Wind the armature just as directed in the original instructions. For the field wind 300 turns No. 20 double cotton covered wire on each spool. Excite the field with some form of bichromate battery or with the Edison-Lalande battery, type R of which will be found serviceable. Use about 5 cells.

(7307) J F. writes: 1. In vol. 72, No. 7, of the SCIENTIFIC AMERICAN, the size of the wire of the induction coil for the solid back transmitter is given as No. 16 A. W. G. for the primary and No. 23 for the secondary coil. Does the A. W. G. mean American wire gage (B. & S.)? If so, is No. 23 wire fine enough for the secondary coil? A. We have not made the coil in question, but have no reason to doubt the correctness of the wire numbers there given. A variation of a few numbers cannot be important. If you wish to use the same number of turns of finer wire in the secondary, you can do so. A. W. G. is for American wire gage. The sizes are the same as in the Brown & Sharpe gage; but, when the gage is made by other reputable makers, they would hardly mark their work B. & S. A. W. G. is the better designation. 2. Is a permanent magnet weakened by magnetizing another piece of steel with it? A. No.

(7308) J. S. H. writes: I have a ¼ horse power No. 2 dynamo. In the directions for winding, it says to use 8 pounds of No. 14 wire (B. & S.) for the fields and 1½ pounds of No. 18 for armature. This makes a series wound for 25 volts and 8 amperes. I want to know the size of wire and the number of pounds it will take for a shunt wound for 50 volts and 4 amperes. It is a direct current dynamo, with a 12 slot illuminated drum armature, 2 inches in diameter and 4 inches long? A. Use No. 21 wire for armature, putting on twice the number of turns as before. For the field, use 10,000 feet of No. 20 wire.

(7309) H. W. asks: 1. Please give size of wire for field and armature to wind Parkhurst motor for dynamo for nickel plating, if it is possible, in SUPPLEMENT, No. 759. A. The machine is properly wound as described for nickel plating. Use large wire for conductors, and place a variable resistance in series with the bath. 2. Can 8 light dynamo be wound for lighting and use the same with lower speed for nickel plating; if so, will you please give size of wire? A. It would not be advisable to wind the machine for both lighting and plating, as the voltage would be too low to transmit the current any great distance through a reasonable size wire. 3. Possibly I could wind field for both outputs and have two armatures, one for lighting and one for plating. A. You can, by using No. 12 wire and winding 4 turns to a coil instead of 16 turns of No. 20 on armature. For the fields use present winding, connecting two coils of the fields in series with each other and in parallel with the other two coils similarly connected together (series). Also place in series with the fields 2½ ohms resistance and connect the fields in shunt. Use a variable resistance between the bath and the machine. You can obtain about 30 amperes thus wound. Your commutator and brushes should be made larger to carry the heavier current.

(7310) R. W. M. asks: 1. As to the Fuller cell? A. The 3 cells you name are for very different purposes. The Fuller cell is for telegraphic and similar work. 2. As to the Latimer Clark? A. The Latimer Clark is a cell for measuring E. M. F., a standard cell, and gives no current. It has no commercial use. 3. As to the Schanschieff? I wish to know about their comparative first cost, cost of running, and lengths of time they run at one charging. I would also like to know about the difficulty of making each. A. You will be able to get prices from firms named in our advertising columns. Many forms of cells are described in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 157, 158 and 159. Price 10 cents each, by mail. The best book on batteries is "Primary Batteries," by H. S. Carhart. Price $1.50, by mail.

(7311) J. G. L. writes: 1. I have a C. & C. battery motor, made by the C. & C. Electric Motor Company, of New York. Motor was made about ten years ago. Is stamped, "Speed 2,200; Type 1 A.; Amperes (blank); Volts, 6." Can this motor, by rewinding or otherwise, be converted into a dynamo? If so, how? And what capacity would it possibly have? A. Your motor is already wound as it would be for a dynamo giving about the volts and amperes it consumes as a motor, at the same speed. To determine its amperes measure the current in the line when it is running. All that is necessary to use it for a dynamo is to connect it to a source of power and drive its armature 2,200 turns per minute. 2. Where can I procure castings, parts, specifi-

cations, etc., of a dynamo that will require one-half to two-thirds horse power to drive it? A. Our advertising columns carry the names of firms dealing in these articles.

(7312) W. J. K. asks: 1. How many ounces of tungstate of calcium would it take to cover a screen 6 by 8 inches square? A. Two ounces, if laid on with great uniformity. 2. I am wishing to make a "Tesla" transformer (similar to the one described in Dr. Morton's X ray) to transform a 2-inch spark of a small static machine to a 6-inch spark to excite an X ray tube. Could you give me any advice as to the way to make it? A. The Tesla coil is fully described in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 1037 and 1124, price ten cents each by mail. We do not think the spark of a small static machine can be transformed as you suggest. The original discharge is not powerful enough to be transformed to so high a voltage. 3. I have started to make a transformer similar to the above one. I took a pasteboard tube ⅝ inch outside diameter, ⅛ inch inside diameter and 7 inches long, and wound one layer (about 13 feet) rubber insulated wire around it, No. 18, and now I have started to wind on the secondary, No. 30, single cotton covered. How much wire will I need to produce the 6-inch spark? 4. Have I enough primary on? A. Follow the directions of the SUPPLEMENTS referred to above. 5. If I use oil insulation, what kind ought I to use, and where can I get it? A. Paraffine oil.

(7313) J. F. A. R. writes: I have built the eight light dynamo as described in SUPPLEMENT, No. 600. 1. I would like to wind a new armature so that I can use it as a motor on a 550 volt current. Now, what size wire shall I wind on armature, and what size on field, so that by changing armatures I can use it as a motor and a dynamo. 2. Can I make and wind an armature so as to get a 110 volt current with the field winding for the other two armatures; if so, what size and how much? Could I increase the number of commutator bars and coils, say, to 30? Cannot the field winding be arranged so as to increase or diminish the amperage at will? Have had the dynamo with its present winding connected with the 550 volt current, but had to disconnect all but one coil or layer on each leg, so as to prevent blowing out the 15 ampere fuses; with the one coil the ammeter still read 10 amperes. I would like to make the armature and field winding so that as a motor it will not read over 7 or 8 amperes, even less if possible. A. On account of the very high voltage it would not be advisable to use the machine for 550 volts as well as 60. To wind it for 550 volts as a motor, make the commutator with 48 sections instead of 24, slot the end of the bar and solder the wires in the slot, instead of using screws. Make the bore of the fields 3¾ inches. Wind the armature with No. 26 wire, putting on 63 convolutions in each of the 48 sections, winding 3 layers deep, 21 turns per layer. For the fields use No. 28 wire, winding 50 layers on each leg. Connect the two sides in series and use as a shunt circuit. As a starting box connect a bank of ten 50 volt lamps in series with the machine, cutting the lamps out one at a time as the machine comes up to speed. In winding insulate thoroughly, using best insulated wire. Do not allow more than one ampere to pass through machine. In a motor the current which it takes depends upon the amount of work which it is doing and not upon the field winding.

(7314) H. H. asks for instructions for making and setting up a sun dial for (approximately) 43° 40′ N. latitude, 75° 20′ E. longitude. As I am only an amateur, the easier the modus operandi and the simpler the mathematical formulas, the better. A. The construction of a sun dial is described with illustrations in SCIENTIFIC AMERICAN SUPPLEMENT, No. 873. Much information regarding them, with illustrations, may be found in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 631, 796, 810, 866, 932, price 10 cents each by mail. The edge of the vertical plate which casts the shadow must make an angle with the horizontal plate equal to the latitude of the place where the dial is to be used. In your case, this angle is 43° 40′. The longitude is not concerned.

(7315) J. O. K. asks: 1. When smoke ascends from chimneys in a straight line, is it a proof of rarity or density of the air? A. Smoke rises when it is lighter than the air. Of course, then the air is denser when the smoke rises than when it does not rise. 2. Should not the field magnets of motor, Edison style, be wound in different directions? A. These magnets are wound so that the pole piece on one side of the armature is +, and that on the other side —. 3. Is there any transformer made for street car currents? A. Yes. A. rotary transformer. The current from the line runs the machine as a motor, and a winding in the armatnre gives a current of the voltage and character required, direct or alternating. 4. What is the meaning of two or three phase systems, etc.? A. A 3-phase system employs an alternating current which flows in three impulses, each ⅓ of an alternation behind the next. Similarly define a 2-phase system.

(7316) D. B. asks: Of what size, proportion, and what size of wire should an electro-magnet be made to produce the greatest amount (approximately) of magnetism from a Leclanche or a good dry cell contact to last 1½ seconds every minute? Should one or two spools be used? A. Use a ⅜ inch soft iron rod, about 2 inches long, for the core of the magnet, and wind on No. 20 or 24 silk covered copper wire to a depth of ⅜ to ½ inch. Two spools will attract an armature much more strongly than one.

(7317) F. R. B. writes: Have a Baush & Lomb student's microscope, ¾ inch eye piece and objectives 1 inch and ¼ inch. Is there a possibility of rigging the instrument up so that I could project the subject on a screen of ground glass? Intend to use 50 candle power acetylene flame at close range. The mechanical part I can handle, but it is in optics that I am a little "shy." A. Take the eye piece out of the microscope and set the tube horizontal. Inclose the light in a box so that the room may be dark, and have an opening into the box against which the stage of the microscope should be placed. Adjust focus till image is distinct on screen. The size of image depends upon the distance of screen from microscope. Good books for you are "The Art of Projecting," A. E. Dolbear, price $2 by mail; and much that is in Hopkins' "Experimental Science," price $4 by mail.

TO INVENTORS.

An experience of nearly fifty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

JANUARY 4, 1898,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

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Car, dumping, Cashin & Shaffer ... 596,478
Car fender, G. Hipwood ... 596,592
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