RECENTLY PATENTED INVENTIONS.

The Inventions described in this Department were Patented through the Scientific American Patent Agency.

Pertaining to Apparel.

STOCKING SUPPORTER. — T. PAPWORTH, Portland, Oregon. This supporter is provided with a pair of jaws which may be attached to the underwear and a link locking device which may be attached to the sock or stocking. The device may be applied wherever convenient to hold the hose taut on the limbs of the wearer.

Electrical Devices.

ELECTROLYTE.—A. VAN WINKLE, Newark, N. J. The invention provides a new electrolyte for use in the electro deposition of zinc on iron and steel. The special object of the invention is to provide increased conductivity of the solution and to improve the color of the deposit as well as to insure a perfect plating, especially on concave surfaces.

Of Interest to Farmers.

MARKER ATTACHMENT.—L. R. TURNER, Long Pine, Neb. An efficient marker attachment for corn planters, and the like, is provided by this invention. The marker indicates the positions to be occupied by rows of plants or hills, and can be automatically disposed in a number of positions.

Of General Interest.

COMPOSITION FOR SOLIDIFYING FLUE DUST.—S. W. RAMSEY and G. W. SMITH, Youngstown, Ohio. In the operation of blast furnaces for the reduction of iron there accumulates a considerable quantity of dust which consists of small particles of oxid of iron, coke, and other constituents of the furnace charge. The present invention has for its object to convert this dust into bricks so that the iron it contains may be reduced.

BUILDING BLOCK.—A. G. MAHLER, Medford, N. Y. This building block is adapted to be quickly laid in constructing walls and is provided with improved means for connecting or bonding the adjacent blocks. The block is also designed to facilitate the application of plaster on the inner side of the wall, and affords a free circulation of air from the interior of the walls to the outside without allowing the admission of rain.

EMBROIDERY FRAME.—G. B. LYON, Ithaca, N. Y. This is an improvement on hand embroidery frames that are composed of a hoop and a clamping device for holding the fabric stretched thereon. In the present invention the hoop is constructed with flanges at each edge between which the clamp is applied. The latter is made of a transversely corrugated strip of elastic metal.

DEVICE FOR AUTOMATIC FIRING OR SELF-LOADING ARMS.—S. H. BANG, 24 Pehlenschlaegersgade, Copenhagen, Denmark. The invention refers to a trigger mechanism in connection with self-loading fire arms by means of which the gun may be made to act either to fire a single shot each time the trigger is pulled, or to fire automatically as long as the trigger is acted upon.

GATE VALVE.—G. H. BENTON, Metuchen, N. J. The construction of this gate valve is very simple and its operation effective. It is arranged to compensate for any inequalities in the seats and the gate faces, to insure at all times a firm and active seating of the valve gates to prevent leakage, and to allow convenient opening and closing of the gate valve.

WIND ACTUATED ADVERTISING DEVICE.—R. RAY, Carrollton, Mo. This advertising device is adapted for outdoor display of moving signs. It consists of a windmill, provided with the customary vane for directing the wheel into the wind and the vane is arranged to receive advertising signs.

Hardware.

SASH FASTENER.—H. ATWATER, Chattanooga, Tenn. The fastener provided by this invention is adapted to be mounted upon the meeting rail of the lower sash and lock both sashes in closed condition. The fastener is strong and conveniently operated and may be adjusted for locking either sash opened more or less, as may be desired.

Heating and Lighting.

BURNER.—W. H. DAMON, New York, N. Y. An improvement in hydrocarbon burners for heating rivets is provided by this invention. The burner is formed with air and fuel passages, a combustion flue surrounding the burner proper having air intake openings in the side and bottom, and a regulating device closely fitting the flue and having like openings in the side and bottom, the openings of the flue and of the regulating device being movable alternately into and out of register.

Household Utilities.

FURNITURE.—F. N. CHURCHILL, Spokane, Wash. The invention relates to a table of simple construction which can be neatly folded. When collapsed it can be shipped or stored without danger of injury to the parts, and at the same time requires a minimum of space.

SAD-IRON HEATER.—G. W. FALLIN, Montgomery, Ala. The body of this sad iron is hollow and carries an alcohol generator, and an alcohol burner. An alcohol generator is first heated to produce alcohol vapor and this is then burned to heat the sad iron. The upper face of the sad iron is thus heated from the inner side, and when it has attained the proper degree of temperature the body of the iron is inverted. While this side is being used the other surface of the iron is heated by the burner so that it will be ready for use when the side in use becomes cool.

Machines and Mechanical Devices.

WELL-DRILLING APPARATUS.—R. D. MOON, San Angelo, Texas. An improved mechanism for lifting the drill and permitting a quick and unimpeded drop of the drill bar is provided by this invention. The use of a high or top-heavy rigging is thus avoided, as well as the great jar and noise found in the use of ordinary rigs.

REVERSING MECHANISM.—T. H. and J. E. HOLGAN, New York, N. Y. The construction is applicable to shafts carrying drill chucks and the mechanism is such that as a drill or tap is brought into engagement with the work the drill shaft will be engaged automatically with the driving pulley in a manner to feed the drill or tap into the material, and as the work is withdrawn, the shaft will be brought into such relation with the driving pulley as to reverse the direction of rotation and withdraw the drill or tap from the work.

STONE SAWING MACHINE.—A. JONES, Oolitic, Ind. The invention relates to stone-sawing machines using rotating drums and endless traveling wires passing over the drums and serving to cut stone. The object of this invention is to permit of adjusting the wires conveniently and quickly in the desired position relative to the stone for cutting the latter into pieces of the desired width.

CONTINUOUS-DRAW VACUUM WINDOW-GLASS MACHINE.—D. H. HERSHEY, Latrobe, Pa. The invention provides a method for drawing glass in a cylindrical form suitable for flattening out to make window glass, also to a method of shaping the glass by producing a partial vacuum around the cylinder of glass as the latter is formed. Means are provided for maintaining a uniform diameter of the cylinder as it is drawn upward from the molten glass.

AUTOMATIC TRIP FOR CONVEYERS.—C. FREDERICKSON, Cameron, Wis. This automatic trip is arranged to operate at any predetermined place so that the material in the hopper may be deposited wherever desired. Should a wagon be under the cable of the conveyor the material may be evenly distributed therein without the necessity of moving the wagon.

MECHANICAL MOVEMENT. — S. JONES, East Liverpool, Ohio. A means for converting continuous rotary motion in one direction into alternate forward and backward rotary motion is provided by this invention. The new movement is adapted for use on washing machines, churns, and the like. It is arranged to automatically revolve a part of the machine, a predetermined number of times alternately, in opposite directions.

GRINDING MILL.—D. S. ANTHONY, Durango, Mexico. The object of this invention is to provide an improved mill more especially designed for grinding middlings and arranged to insure ready grinding of the corn, or other material, to any desired degree of fineness, and to allow easy sharpening of the grinding members.

MACHINE FOR FINISHING THE PACKING OF BARRELS.—L. STORCK, J. H. VOGT, and L. STORCK, Stamford, Conn. An improvement in machines for finishing the packing of barrels with pulverized or granulated material is provided by this invention. The machine is especially constructed to perform this operation on shipping cases which have been packed by a machine previously invented and patented by Messrs. Vogt and Storck.

SOUND BOX.—J. C. KERR, Valparaiso, Chile. The invention provides a sound box for talking machines in which practically the entire quantity of sound waves produced is forced to pass through the sound tube, and in which inharmonious or disturbing vibrations are avoided and all deadening of the sound waves is prevented.

PIANOFORTE.—W. R. T. HILL, Asheville, N. C. The invention provides an improved frame for pianofortes in which the tension on opposite sides of the frame is balanced so that the bending strain of the frame is eliminated, and the sound boards are made without ribs, the strings resting on the bridge at each end.

Prime Movers and Their Accessories.

FEED WATER HEATER.—J. H. KIDWELL, Staunton, Va. This feed water heater is designed for use on locomotives and is characterized by the fact that it utilizes the exhaust steam from the cylinders for the purpose of heating the feed water as well as using the hot gases in the smokebox at the front of the boiler for the same purpose.

STEAM TRAP.—A. L. RIGGS, Ebensburg, Pa. This improved steam trap is arranged to insure a positive and easy working of the valve controlling the inflow and the discharge of the water and means are provided for holding the valve locked in one position until the trap is accurately filled with a predetermined quantity of water. The valve is then held in its other position until this quantity of water has been discharged.

Railways and Their Accessories.

GRAIN CAR.—J. T. MCNALLY, Chicago, Ill. The car is designed to discharge the grain through a double bottom, provided with openings, the openings of one bottom being movable into and out of register with those of the other bottom. A door is adapted to cover these perforated bottoms when the car is to be used as an ordinary box car and this door is also adapted to cover one of the door openings in the side of the car when the car is to be used in hauling grain.

Pertaining to Vehicles.

TRANSMISSION MECHANISM FOR MOTOR VEHICLES.—C. M. LEECH, Lima, Ohio. The construction of this mechanism is such that its operation will have no tendency to throw the driving shaft out of alinement and the movement of the vehicle both forward and rearward can readily be controlled and gradually varied, the transmission passing from a friction to a positive drive on shifting the gearing from slow to full speed.

SPRING SUPPORT.—T. J. FAY, New York, N. Y., and J. M. ELSWORTH, Bernardsville, N. J. The invention relates more particularly to specific means for securing the spring supports of motor vehicles to the body or chassis. An improved clip is provided in which the securing bolts are formed integral with the main body of the clip so that the breaking of a bolt will not loosen the spring and the spring will be firmly held at all times unless all of the bolts should become broken.

DRAY WAGON.—G. R. MCLERAN, North Yakima, Wash. This invention provides an improvement in dray wagons, such as are used for hauling heavy loads of all kinds. The axle of the wagon may be lowered by locking the wheels to the axle and the wagon when then moved forwardly operates to adjust the main frame over the axle. In this manner the load may be lifted and secured to the wagon.

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

Full hints to correspondents were printed at the head of this column in the issue of August 8th, or will be sent by mail on request.

(10956) A. H. N. says: If soft coal ashes be mixed with water to the consistency of mortar and then put in a round oak or other soft coal heater on a good bed of coals and the drafts opened, this mixture will burn freely. How do you explain this anomaly? A. There is always a considerable percentage of unconsumed fuel or combustible in ashes—especially soft coal ashes—even though they may appear to be free from coal; so that they will have a certain amount of fuel wherever they can be burned without clogging up a fire and choking the draft. The addition of a moderate quantity of water to a hot soft coal fire has a curious effect. If the temperature is sufficiently high, the water is decomposed, forming free oxygen and hydrogen, which later reunite at a point usually some distance above the body of the fire in a hot flame. No heat is actually added to the fire, the effect being to abstract the heat from the coals and give back the same quantity of heat in flame above the fire, oftentimes giving the appearance, however, of making a hotter fire. In cases where a long flame is desirable, as in fire under a steam boiler, it is a common practice to wet the coal before firing it, for this reason. These facts will probably help you to explain the phenomenon you have observed.

(10957) M. F. S. says: 1. Would you kindly explain the real meaning of the word "watt"? One says that a 16-candle-power lamp takes 56 watts, say 60 watts for convenience, per hour. If it takes 60 watts per hour, it should take 1 watt to light it for 1 minute. Yet we all know that it takes the full 60 watts to light it even for one second. A 300-watt dynamo does not give 300 watts per hour, it gives them all the time; if such a dynamo were connected with a watt-meter, would the watt-meter register 300 watts after an hour? A. A watt has no reference to time. It is the unit of electric power. And just as a horse-power works right along, a second, an hour, or any other time and is the same horse-power, so the watt is the same for any time. If a lamp requires 60 watts to light it, it will require the 60 watts for a second just as really as for a whole day. What is paid for on the watt-meter is the watt-hours. If 1,000 watts are used for one hour, that is a kilowatt-hour; and if for ten hours, the consumer must pay for ten kilowatt-hours. This too is just the same as the horse doing work. If one hires a horse which might do a horse-power of work, he will pay for the same horse working for the entire time which he does work. The idea seems simple. 2. Does the sun have any direct influence upon the weight of objects on the earth? Example: Will an object be theoretically heavier at midnight than at midday? A. The weight of objects does not vary from noon to midnight because of the position with reference to the sun. The change of distance from the sun in that time is so small as compared with the immense distance of the sun as to be of no value at all.

(10958) F. G. S. asks: Is there any simple formula for calculating the power of a magnet when the size of wire, number of turns, and E. M. F. of battery are known? Will this formula apply in the case of a solenoid? A. The tractive power of a magnet is found by the formula Pounds $= \frac{T C M \sqrt{A}}{2661\, L}$ in which T is the number of turns of wire, C the current in amperes, M the permeability of the iron of the core, A the area of pole pieces, and L the mean length of the magnetic circuit. For a solenoid without iron the permeability is 1, since the permeability of the air is the standard of comparison, and hence is unity. For a straight coil the result will be of little value because of the great leakage of lines of force, and the great length of the circuit of the lines in the air.

(10959) J. H. S. asks: The difference between the work a 5 x 5-inch engine is capable of performing against what a 5 x 6-inch would do, both engines running equal speed, with valve lifts, compression, and all conditions being equal. The direct argument is that if two cars were built identical with the exception of the motor, one to be a 5 x 5-inch and the other to be a 5 x 6-inch direct connected, or in other words one-to-one speed, which car would be the fastest provided they were driven to their limit? Also, would you please explain how much faster a 5 x 5-inch would have to run in order to develop the same horse-power as a 5 x 6-inch; also what relation the piston speed bears to the horse-power of a motor. This last subject is one which seems to be very poorly understood; and while the writer is well aware just what relation it does have, we would like to have you give us an explanation of the matter. A. If we may take your last question first as the simpler, the relation of piston speed to horse-power is exactly the same in an internal combustion engine as in a steam engine, i. e., increase of piston speed indicates either decrease of load or increase of power generated in exactly the same proportion in one as in the other. Your first question cannot be quite as positively answered, for the reason that indicated horse-power has not quite the same relation to brake horse-power in internal combustion as in expansion engines, partly, if not principally, for the reason that whereas in the latter the difference is entirely friction in the engine, in the former it includes overcoming of inertia in the three "dead" strokes including compression of the gas. For instance, an ignition at any later moment than the dead point decreases the area of the card, from which, if complete analogy with steam engine indication existed, a loss of power would be presumed, whereas it is found in practice that retarding the ignition up to a certain point increases the power measured on the brake. As far as your question is concerned, however, the difference in power between a 5 x 5 and a 5 x 6 engine at the same R. P. M. would depend upon only two interdependent variables, the mean effective pressure and the stroke. There would be a slightly higher pressure in the 5 x 6 before ignition, on account of a larger volume of gas having been inspired and compressed into the same space, but this may be neglected. For the purposes of calculation we must suppose the ignition to be at a point 1 inch from the beginning of the stroke in both engines, as without knowledge of the period of ignition we cannot otherwise calculate the relative volumes to which the gas expands. In the formula $\frac{plan}{33{,}000}$ = H. P., p in the 5 x 5 engine = $\sqrt{p_1 \times \frac{p_1}{5}}$ and in the 5 x 6 engine = $\sqrt{p_1 \times \frac{p_1}{6}}$ l = in the first case $\frac{5}{12}$ and in the second $\frac{6}{12} = \frac{1}{2}$ Therefore: H. P. of 5 x 5 engine : H. P. of 5 x 6 $:: \frac{5}{12}\sqrt{\frac{p_1}{5}} : \frac{1}{2}\sqrt{\frac{p_1}{6}}$ $= 0.186 : 0.204$; that is to say, the 5 x 5 engine has roughly 90 per cent of the power of the 5 x 6 at the same speed, and must therefore run about 9 per cent faster under the same load to deliver the same power as the latter. This is, of course, not an accurate figure, which cannot be obtained without a careful test by both indicator and brake, but it is a fair approximation, sufficient, we hope, for your purpose. The inaccuracy lies in the determination of the ratio of expansion.

(10960) A. L. T. asks: Will you be so kind as to inform me if it is possible or impossible to make a so-called permanent magnet out of a pure soft iron, i. e., a magnet, for example, similar to the steel horseshoe magnets as now made? Can a permanent magnet be made out of any iron? I do not refer to the residual magnetism remaining in the field magnets of a dynamo when not in motion. A. Any iron or steel which has once been magnetized does not again lose all its magnetism, except by heating it red hot. Its magnetism is then destroyed. Good soft iron, cast or wrought, will, however, retain but little mag-

netism after the magnetizing force is removed. The retentivity to which you allude is the same property in steel as in iron. The field magnets of a dynamo, when of iron, retain little; when of steel, retain more magnetism. A hard steel retains so much that it is called a permanent magnet. It, however, does not retain full magnetic saturation, but loses considerable magnetism very soon after the magnetizing force is removed from it. It is strongest just after it is magnetized. From the above it will be seen that a magnet cannot be made of iron which deserves to be called a permanent magnet.

(10961) M. C. asks: 1. How long an exposure would be necessary to make a lantern slide, by having a negative in contact with a plate in a frame? Exposure by candle or lamp light. A rather fast plate being used, for instance, a framer Banner X. A. The time of exposure for a lantern slide depends upon the density of the negative, the light and other factors being the same, and if you are in doubt draw the slide and expose one-quarter of the plate at a time till the whole is exposed. Then develop and find which part was correctly exposed. A slow lantern slide plate should always be used for the positive for a lantern slide. Such plates are made by all manufacturers. You will have to get the time of exposure by experience. 2. Which in your opinion gives the best negative technically—the tank or time method, the tentative method, or the Watkins factor method? A. Personally we do not like any of the methods of developing you mention. We always use a dark room, and watch the progress of the development. We have no decision to give upon the tank, time, or any other method. With a correct exposure almost any method will produce a good negative; without that, no method can bring forth a fine result.

(10962) J. R. D. asks: If agreeable, will you kindly advise what metal has the most expansive property when subjected to heat, and also state to what extent quicksilver or mercury will expand by heat, and whether or not quicksilver expands more by heat than does water? A. We give you the rates of expansion of several of the metals which expand most rapidly by heating: Potassium 0.000249, sodium 0.000218, mercury 0.000182, indium 0.00014, cadmium 0.000094, lead 0.000088, aluminium 0.000070. Mercury expands more than water does for the same change of temperature near the freezing point. The rate of expansion of water as given in the "Physico-Chemical Tables" of Castell-Evans is 0.0000644. All the figures we have given above are from the same tables, which are of the highest authority.

(10963) T. H. P. asks: Is there any magnetic rod, or anything of the kind in use, for locating gold or silver? If so, where can I get one? A. There is no possible means of locating gold or silver ore by magnetism. Magnetism has no effect whatever on either of these metals, and any claim to locate deposits in the earth by a magnetic rod has no basis.

(10964) P. G. P. asks: Please tell me what is the nature of phosphorus? Can it be kept in a sealed bottle indefinitely? Will it retain its light-giving properties indefinitely? Will heat affect it? A. Phosphorus is one of the elementary substances, just as iron and lead are elements. It does not give light when it has been shut up in a bottle for some time. It can be kept under water anywhere. So long as it is kept away from oxygen it cannot give light or take fire. If the oxygen of the air has access to it, it grows hot and takes fire. Its light is due to the slow combustion of the phosphorus by oxygen, causing it to glow in the dark.

(10965) D. L. asks: 1. Kindly explain through your magazine how, by experimenting with a pendulum, it has been calculated that the gravity force of the earth is 289 times as great as the centrifugal force at the equator. A. The force of gravity at any place is determined from the time required by a pendulum of known length at that place to make one oscillation. The centrifugal force of the earth at the equator is determined from the length of the day, or the velocity of rotation of the earth at tor is 32.0902. Hence if there were no centrifugal force as 0.1112 of the mass of a body at the equator, which makes the body lighter by this amount. The force of gravity at the equator is 32.0902. Hence if there were no centrifugal force, the weight of a body would be the sum of these two, or 32.2014, which is the real mass of the matter of the body. Hence centrifugal force lightens a body 0.1112/32.2014, which equals 1/289 very nearly. You can find all these matters demonstrated in the library of the university of your city. The librarians will assist you to find what you need, or the professor of mechanics or astronomy will advise you. Watson's "Theoretical Astronomy" will contain it. 2. From an infinite or very great distance, in an astronomical sense, our earth will attract a body with an ultimate velocity of 7 miles a second at the moment it would strike the earth. How can I find the corresponding velocity with reference to the sun and the moon? A. You will find the solution of the problem of fall from infinity in Watson as above, or in Young's "General Astronomy," Section 429. We can send you the book for $3.25. 3. If we imagine a tunnel through the earth and through its center (or 8,000 miles long), then letting a body fall into it, what would be the maximum velocity, and at what point in the tunnel would that velocity be attained? A. A body falling through the earth as you describe will have its highest velocity at the center of the earth. The finding of the velocity is a problem of analytical mechanics, to which we refer you. 4. If a bullet sent out from a rifle and in a perpendicular direction will reach a height of one mile, how far would it go at an angle of 30 degrees with the horizontal plane? A. If a bullet will rise a mile in a vertical direction, it will rise to the same distance when rising at an angle of 30 degrees to the horizon. 5. What would be the weight of a cubic foot of water at a depth of 8 miles? A. The compressibility of sea water is 44 millionths per atmosphere at 12 deg. C.; that of pure water at the same temperature is 47 millionths, while at the freezing point it is 50.3 millionths. The temperature would vary considerably as we descend in water. Upon this datum you can calculate the density at a depth of 8 miles. We must say that your questions remind us of an examination paper in college, and we never liked to take examinations.

(10966) G. B. asks: In projecting a lantern slide upon a screen with a single double convex lens the lines on the picture, when viewed close to the screen, within a foot or two, give the colors of the rainbow. If, however, the observer goes back ten or twenty feet more from the screen all this color effect immediately disappears. Will you please explain why this color effect is not equally visible at this distance? I understand, of course, if a chromatic lens is used there will be no such color effect. What I do not understand is why, when you see it so plainly at a foot away, you cannot see it equally plainly at 10 feet, although all the other parts of the picture are equally visible at either distance. A. The lines of a picture are visible to the eye when a line subtends an angle at the eye of about a minute of arc. This is the limiting angle of vision without optical assistance. When one stands one foot from the screen on which is a picture with lines projected by an ordinary convex lens, the lines fill more than this angle. So also do the interference fringes on the edges of the lines. At 20 feet distance from the screen a space twenty times as broad is required to fill the same angle as was filled by a line at one foot distance from the screen. All which is in the wider space is combined in the eye at 20 feet into an image of the same size as was occupied by the line at 1 foot. The color fringes then are combined into white light again, and only the black is seen. If one uses an opera glass at 20 feet the colored fringes are restored and are as visible as at the 20 feet divided by the magnifying power of the glass. If a glass magnified five diameters the lines and fringes appear as when seen at a distance of 4 feet. The restoration of the colors by the opera glass constitutes rather a pretty optical experiment.

(10967) R. D. F. asks: Would you kindly answer these questions? Why will a rainbow form a half-circle at sunset? Why does a rainbow usually show less than a half circle? Why would a bow form a complete circle seen from a balloon? A. A line drawn through the center of the sun and the eye of the observer passes through the center of the rainbow. This line is called the axis of the bow. An angle is formed with this line, the vertex of the angle being at the eye. At an angle of 40 degrees from this line in every direction violet may be seen, and at 42 degrees from this line red may be seen. It should be obvious that all the points which are at the same angle from the axis will lie on the circumference of a circle. The rainbow is for this reason a circular arc. When the sun is on the horizon, the axis will be in the horizon and a half circle is above the horizon whose other half is below the horizon. At sunset then a rainbow will be a half circle. If the sun is high in the heavens, the axis line will go below the surface of the earth before it reaches the horizon, and the part of the rainbow seen will be less than half a circle. If one is upon a mountain top, so that the axis extends far out above the horizon, more than half of the circle of the rainbow will be seen, and from a balloon it is possible to look down upon a cloud and see a circular rainbow, or the whole of the bow. Looking down upon the spray of Niagara Falls, one may see more than half a circle of a rainbow formed by the sun's rays in the gorge below.

(10968) W. W. asks: What is the scientific explanation of the fact that if an egg is held between the hands and compressed along its longitudinal axis, it is almost incapable of being crushed, while a pressure on a transverse axis readily accomplishes a contrary and expected result? A. The ends of an eggshell are domes, and are filled with an incompressible liquid. If these domes are fitted into the soft palms of the hands, and pressure evenly applied to the shell in the direction of its longitudinal axis, it will require considerable force to crush the shell. The liquid contents prevent the shell from collapsing inward; the soft palm prevents it from bursting outward. The part of the shell which is not covered by the hands is very nearly a cylinder, and although it is thin it has considerable strength to resist crushing.

(10969) A. E. S. asks: Kindly advise if an electric doorbell circuit can be formed with the ground and a single wire for a distance of two blocks. Also the formula for the solution of saltpeter used in destroying tree stumps by boring a hole and allowing the fluid to remain all winter and in the spring pouring in kerosene and setting afire. A. An electric circuit can be completed through the earth for any purpose. Make a good ground at each end of the line in water or moist earth, and the bell will ring as well as if a return wire is used. There is no formula needed for using saltpeter on a tree stump. Bore deep holes in the stump, fill them with saltpeter and then with water, and plug the hole. This is done at any time. After six months or longer open the hole, fill it with kerosene oil, and set this on fire. The saltpeter causes the fire to smoulder in the wood.

(10970) R. R. asks: Will you please answer the following question in physics for me? What is the difference, if any, between "mass" and "weight"? For instance, what is the difference between 10 pounds mass and 10 pounds weight; or between 10 kilogrammes mass and 10 kilogrammes weight? A. The mass of a body is determined by the quantity of matter the body contains. Any body has an invariable mass. The weight of a body is not invariable but is affected by the force of gravity at the place of the body. The same mass, 10 pounds of lead, for example, will be the same all over the earth, but it will not weigh the same. It is customary to consider the unit of mass as the weight at a place where the intensity of gravity is unity. At Paris, France, the intensity of gravity is 980.96 cm. The weight of a body at Paris is then 980.96 times its mass. Mass is defined as weight divided by gravity; or weight at any place is its mass multiplied by gravity at that place. Gravity at Washington is 980.10.

(10971) R. R. S. asks: 1. Would a man standing exactly at the North Pole or twenty feet from the Pole be sensible of the earth's rotation from west to east? A. A man at or near the North Pole of the earth would see the stars move in circles, clockwise, sensibly parallel to his horizon without rising and setting. The sun would rise and set once a year, the moon once a month. While above his horizon they, too, would move clockwise around the sky. In this way the earth's rotation on its axis is just as sensible to a man at the Pole as to one at any other point of the earth. 2. Why does the moon rise farther in the north in the winter? And why does it appear nearer the zenith when it is nearest to us? A. The moon rises at the same points of the horizon every lunation. Half of its month it is north of the equator and half of its month it is south of the equator. We only notice the rising of the moon when it is near its full. The full moon is always opposite the sun. In winter the sun is south of the equator, and full moon is north of the equator, in the same part of the sky where the sun is in summer. Hence the full moon runs high in winter. The moon does not appear nearer the zenith when it is nearest the earth. Perigee may be at any phase of the moon since new moon occurs in all points of the orbit in each cycle of the series. 3. How long does it take the sun to make a rotation? A. The time required for a spot to pass from the center of the sun around to the center again is on the average 27.25 days. This is the synodic period of the sun's rotation. The true, or sidereal period, is determined from this to be 27.35 days. Different observers obtain slightly different results, varying from 27.23 days to 27.38 days. The sun's rotation is very peculiar in that the velocity is not the same for different latitudes. This would show that the surface of the sun is not solid, but in a fluid condition. This is discussed in Prof. Young's book on the sun, which we send for $2.

(10972) W. F. J. asks: Why does a charge of electricity (static) pass to the outside surface of a hollow conductor? If the conductor were a solid would the charge pass to its outward surface also? A. A static charge of electricity is on the surface of any conductor, solid or hollow. The reason is the self-repulsion of the parts of the charge for its own parts. Each unit of electricity is as far as it can get from every other unit of electricity. 2. Why is there no lightning in winter? A. There is lightning in winter. We have seen vivid lightning in mid-winter in Massachusetts, lighting the snow to the greatest brilliancy. It is not a common occurrence. 3. Why is the external characteristic of a shunt dynamo a loop? A. The external characteristic curve of a shunt-wound dynamo is a loop because of the fact that all the current goes to the fields when the external circuit is open. The voltage is then the maximu- but there is no current. When the external circuit is closed the external resistance is high and the field coils now begin to receive current, which weakens the voltage. As more and more current passes through the external circuit, less current passes through the field. A point is finally reached where the reduction of external resistance takes so much from the field that the E. M. F. falls more rapidly than before and current begins to decrease also. From this point both current and E. M. F. fall steadily to zero by cutting out resistance. See Sloane's "Handy Book for Electricians," which we send for $3.50.

(10973) M. E. B. asks: The writer would like your advice on the most promising line of engineering that a man might take up, the line with the biggest future. I have been a salesman for the past four years, but don't seem to be able to realize more than two thousand a year in that work, so intend to take up some branch of engineering. I graduated from college as a chemist, but in my experience it is one of the poorest paid of the professions. Having a natural bent toward mechanics, I have been considering taking up structural steel or electrical engineering, but not knowing the line that gives the most promise I would ask what do you suggest, and would it be more profitable to take up a whole department or specialize? A. We are not able to give advice as to the line of work a man should take up, not knowing him personally, excepting to say, take up what you like best. No one can say whether steel construction or electricity work would pay best. It all depends upon the man. If he can push himself into jobs either will pay well. To work on a salary at either in the employ of a company will hardly pay any better than employ by a mercantile company. To make money in either line one must be able to take contracts and get the profits of them. You are the best and only judge of yourself. Decide the line you want to take up and push into it.

(10974) J. A. T. writes: Would you kindly tell me where and how I can obtain any information in regard to placer or hydraulic mining methods? Anything in regard to cost and places where this method is pursued will be appreciated. A. You will find instructive articles on hydraulic placer mining in our Supplement Nos. 455 and 1281, and we can also recommend the "Hydraulic Gold Miner's Manual," by T. S. G. Kirkpatrick, $2.25, with which we shall be pleased to supply you. California is the principal scene of hydraulic mining in this country, but the valleys of the Rockies are full of it, where discoveries of placer gold have frequently, if not generally, preceded those of lodes in the hills. It is being superseded in many places by dredging, which facilitates the excavation of gravel from places where hydraulicking is impossible, on account of the difficulty of disposing of tailings. By the latter method gravel may be excavated and washed at a cost so low that gravel carrying gold values of five cents to the ton have been made to pay.

(10975) E. L. says: Does the wheel on the outside rail revolve oftener than the wheel on the inside rail? If not, why not, recognizing that the outside rail is longer than inside rail? A. We would say that the wheels on a steam railroad car or locomotive are rigidly attached to the axle, and therefore have to revolve together at exactly the same rate of speed. The outside rail, however, on a curve, is longer than the inside rail. This makes a certain amount of slippage between the wheels and the rails unavoidable when going around curves. The wheels, however, are somewhat larger in diameter near the flange than they are a few inches away from the flange, and the tendency is for the flange to hug the outer rail of the curves. Therefore, the outer wheel as it is rounding the curve is rolling on a somewhat longer diameter than the inner wheel. This tends to decrease somewhat the amount of slippage there would otherwise be.

(10976) J. H. S. asks: In a great many electrical books and articles on electricity I have noticed the amperage of a certain piece of apparatus is stated, but the voltage is not mentioned at all. How are we to determine the number of watts consumed if the voltage as well as the amperage is not stated? I notice in the "rules and requirements of National Board of Fire Underwriters" they give the carrying capacity of wires in amperes alone. How are we to know whether the capacity they state is for 50 or 220 volts? In field winding we are told so many ampere turns are required per square inch pole face surface for a certain density. How are we to determine the number of turns required if we do not know how many amperes are going to flow over the wire when wound? A. It has been our experience to find both the volts and amperes of a dynamo or motor, or the volts and kilowatts given on the name plate. The carrying capacity of wires is given in amperes because it is amperes which the wires are to carry and not volts. The amperes heat the wires, and not the volts, and the higher the voltage the finer the wire required to carry its current. Hence volts are of no importance to the Fire Underwriters, except to classify the rules for wiring as they do for different voltages. The safety of people from shock depends upon the voltage and not upon the amperes. In the winding of a dynamo the current required to magnetize a field has been determined by the designer, who assumed the amperes and the size of wire to carry them when he determined the size of the magnet cores to give the desired voltage to the machine. Hence the ampere turns are known.

(10977) A. B. wishes to learn more about lunar rainbows. A. Some of the correspondents of our paper who have reported upon lunar rainbows of late seem to be confusing two phenomena which are very unlike and due to entirely different causes—the rainbow and the halo. A rainbow is due to falling rain from a cloud which is on the opposite point of the horizon from the sun or moon at the time. The sun or moon cannot be very high above the horizon and have a long arc of the bow visible, not over 42 deg., at which angle none of the arch would be seen. A rainbow is a half circle at sunrise or

sunset. In a primary bow the red is on the outside of the arch. If two bows are seen, the outer one has the red on the inner side of the arch. If a bow is formed by the moonlight at night, the colors are very faint, and very rarely or never can more than three colors be distinguished—red, yellow, and green. Lunar rainbows are not frequent, and one is fortunate to see one. The writer has seen two in forty years. They are doubtless formed more frequently in one's field of vision, but are so faint as to escape notice. Halos, on the other hand, occur frequently, and are seen without any difficulty in the vicinity of both the sun and the moon. The rings of colored light, seen close to the sun and the moon, or nearer than 10 deg., are called coronæ. The smallest halo has 22 deg. radius, or about half that of the primary bow, but it is a ring with the sun or moon in its center. It surrounds, when seen fully, the sun or the moon. A halo of 46 deg. radius and one of 90 deg. radius are also formed. White circles are also seen, which pass through the sun or moon and are parallel to the horizon. Where these circles cross the circle of the halo, we sometimes see so bright a spot of light that it is called a mock sun, or sun dog. Complicated figures are sometimes formed by the crossing of these circles. The halo of 90 deg. is very rarely formed. The writer has never seen but one. Halos are always at a very great height above the earth's surface, so high that water cannot exist, and the halo is formed by refraction and reflection of the light in crystals of ice. They are signs of a storm, since they indicate the saturation of the upper air, and the lower air will soon be affected. These are not discussed very fully in recent meteorologies. The reader is referred to Loomis's "Meteorology" for much interesting matter upon all these subjects.

(10978) M. D. S. asks: I desire to secure the formula of the solution for making blue prints; how to apply it to the paper, and how to develop and finish it, after printed. Can you inform me of any book treating on the matter and where to procure it? A. To make solution for blue-print paper, make a solution of potassium ferricyanide, 1 ounce to 5 ounces of water; also a second solution of 1 ounce of citrate of iron and ammonia to 5 ounces of water. These two solutions will keep indefinitely in separate bottles. To prepare the paper, take equal parts of each solution and mix them. The mixture is sensitive to light, and the rest of the work must be done in a feeble light. With a swab dipped in the solution cover the paper by passing across in parallel lines, and afterward crosswise of these, so as to have an even layer of liquid all over the paper and yet not enough to flow or drip. The paper is hung by a pin in the dark to dry. It is then ready for printing. After printing in bright sunlight, the picture is developed by putting it under water. Wash thoroughly till the white parts of the picture are clear.

(10979) W. K. asks: 1. What action (chemical) does zinc chloride furnish in a dry cell? Sal-ammoniac? Does manganese furnish any action besides its depolarizing effect? A. The zinc chloride does not exert any chemical action in a dry cell directly; that is, the action of the zinc and ammoniac chloride (sal-ammoniac) is to form zinc chloride. The zinc salts put into a dry cell serve principally to keep the paste porous and moist, since these have a strong affinity for water. Manganese dioxide serves simply as a depolarizer in a dry cell, as it does in a wet cell. 2. Does high initial amperage increase life of a battery, or does it mean that it will be short-lived? A. The amperes of a cell depend upon the external resistance, and there is no propriety in giving amperes, unless it is stated also against what resistance the amperes are flowing. If a large number of amperes are drawn from a cell at first, the cell will be shorter lived than if a low amperage is drawn. A cell will have a certain number of ampere-hours of life. If 100 ampere-hours, the cell will last approximately 100 hours if 1 ampere is the rate of current, but only 10 hours if 10 amperes be drawn. This law is as true of dry as of wet cells. 3. What do you consider best type of wet and dry cells on market to-day for telephone service? A. We have no judgment to give as to the best dry or wet cell. We presume there is no cell which deserves such a distinction. There are many reliable houses offering cells. We presume your local dealers are reliable, and that you are safe in taking their advice. We do not advertise in Notes and Queries. Our advertising columns may be consulted, and we think our advertisers are unusually reliable. We doubt if there is any such thing as a superlatively best thing of any kind. We are not willing to say that there is. 4. In gas and gasoline engines, what affects the life or service of the batteries? A. There is nothing very peculiar in the service a battery performs on a gas engine, except the regularity of its action. It wears out as any other battery does by the work it does, and rather sooner because of the constancy with which it is called upon for current. It is a popular impression that a battery should last indefinitely, but really it is like any other source of power. It can only give back the power which is given to it, and when that is done the battery stops work. No one is ever ready to have the battery stop. Few understand that a battery uses up materials as an engine uses up coal. So much zinc and chemicals, so much electricity. It is a simple matter.

NEW BOOKS, ETC.

ARTS AND CRAFTS IN THE MIDDLE AGES. A Description of Mediæval Workmanship in Several of the Departments of Applied Art, Together with Some Account of Special Artisans in the Early Renaissance. By Julia De Wolfe Addison. Boston: L. C. Page & Co., 1908. 8vo.; 378 pages. Price, $3.

The very general and keen interest in the revival of arts and crafts in America is a sign full of promise and pleasure to those who are working among the so-called minor arts. In this connection, it is interesting to look into the past, particularly those centuries known as the Middle Ages, in which the handicrafts flourished in special perfection, and to see for ourselves how these crafts were pursued, and exactly what these arts really were. There are very few books dealing with the arts and crafts of the olden time, which are adapted to inform those who have no intention of practising such arts, and yet wish to understand and appreciate the examples which they see in numerous museums or exhibitions, and in traveling abroad. Mrs. Addison's book, consequently, will be welcomed by a large class of readers. "Arts and Crafts in the Middle Ages" is not merely a beautifully illustrated "art book." It is a valuable work, destined to fill a special niche in the library of books which are worth while.

MARINE ENGINEERING. A TEXT BOOK. By Engineer-Commander A. E. Tompkins, Royal Navy. London: Macmillan & Co. New York: The Macmillan Company, 1908. 8vo.; 812 pages. Price, $4.50.

The writer was until recently instructor in steam and marine engineering, marine construction, etc., at the Royal Naval College, Greenwich, England. All those who go down to the sea in ships have a profound respect for those that oversee that mechanical underworld of the great vessels. It is more than surprising to note what a vast amount of detail the marine engineer has under his control. Even to those who are moderately familiar with marine practice, this book will prove a revelation. It is filled with the most valuable material. The illustrations are numerous, well executed and, as far as we can see, they are new. Engines of all sizes and descriptions are dealt with as well as auxiliary engines, such as capstan-engines, blowing engines, and pumps. Great attention is paid to the propeller. The water-tight system is also taken into consideration. Electrical machinery comes in for a fair share of attention. Boiler preservation and repairs, care and adjustment of machinery, the engineer of the watch, are all adequately dwelt upon. The subject of marine steam turbines is very well discussed, and the very latest practice, as the engines of the "Mauretania" are outlined. Internal-combustion engines for boat propulsion are also included. The entire book has been rewritten and revised, and forms a complete text book for the construction and working of steam engines and boilers.

INTERNAL COMBUSTION ENGINES. Their Theory, Construction and Operation. By Rolla C. Carpenter, M.M.E., LL.D., and H. D. Diederichs, M.E. New York: D. Van Nostrand Company, 1908. 8vo.; 597 pages. Price, $5.

This is a very well-made book and the intention of the authors in its preparation has been to present in as simple terms as possible the fundamental and theoretical principles relating to the internal combustion engine, and to describe the various methods of applying these principles to practical construction. The book does not in any way treat of the proportion and strength of the various machine parts. It is largely a compilation from different sources and is, in the main, an outgrowth of a course of lectures on the internal combustion engine delivered to students of Sibley College during the past three years. The thermo-dynamics of the gas engine, the theoretical comparison of various types, combustion, fuels, history of the gas engine, modern types of internal-combustion engines, ignition, mufflers, starting apparatus, estimation of power of the gas engine, methods of testing internal-combustion engines, and performance of gas engines and gas producers, cost of installation and operation all come in for liberal treatment. One of the most peculiar-looking engines in the book is the Sargent complete-expansion engine. It is built as a double-acting tandem. There is but one valve to control admission and exhaust for each end of each cylinder. A single cam performs these various phases while a second cam operates the igniter. The construction is radically different from that used by other designers.

THE MOTORMAN AND HIS DUTIES. By Ludwig Gutmann. Sixth Edition. Revised and enlarged by Lawrence E. Gould. Chicago: The Wilson Company, 1907. 16mo.; 195 pages. Price, $1.50.

The purpose of this book is to familiarize the reader with the operation of an electric car. It tells in simple, terse language, devoid of all technicalities and mathematics many points not generally understood by the average employee who has to do with the operation of a great electric railway rolling stock. Such knowledge cannot fail to make his services more valuable to his company and more satisfactory to himself, and fit him for promotion. The book is intended not only to explain the parts of an electric motor car, but to give some general instruction and advice to those who desire to make the handling of cars their livelihood. It is based on experience gathered during a number of years in the electric railway field, instructing motormen in their duties and work and on results and observations made on operating roads.

MOTOR CAR PRINCIPLES. The Gasoline Automobile. By Roger B. Whitman. New York: D. Appleton & Co., 1908. 12mo.; 318 pages. Price, $1.25 net, postage extra.

As the technical director of the New York School for Automobile Engineers Mr. Whitman is peculiarly well fitted to write a book on the mechanical principles of the motor car. His little volume is primarily intended for the man who is not endowed with overmuch technical knowledge, but who wishes to learn all that he can about his car. For that reason Mr. Whitman has written his treatise in an easy, simple style, which will not strain the mind of a man who is not a trained engineer. The book is divided into thirteen chapters, in which are discussed gasoline engine principles, engine parts, engine balance, 2-cycle engines, carbureting and gasoline feeds, ignition, transmission, running gear, the location of troubles and maintenance and construction.

AMERICAN MACHINIST'S HANDBOOK AND DICTIONARY OF SHOP TERMS. By Fred H. Colvin, A.S.M.E., and Frank A. Stanley. New York: Hill Publishing Company, 1908. 18mo.; 511 pages; full leather limp. Price, $3.

It is with a feeling of confidence that we open this handsome little pocketbook, for the American Machinist has always stood for accuracy and reliable shop methods. The book is filled with good diagrams and tables. We always welcome an accurate pocketbook as it is always certain to cut down trying mental work. This work is very largely devoted to machine shop practice. It is worthy of a good sale.

SMALL HOLDINGS. By F. E. Green. London and New York: John Lane Company. 16mo.; 122 pages. Price, $1 net.

The author has written of conditions which obtain in England, but at the same time it will prove of great interest to those who have small places of say 10 to 25 acres. Full details of receipts and expenditures are given. The book is charmingly illustrated with engravings printed in duotone.

NOTES ON PRACTICAL MECHANICAL DRAWING. By Victor T. Wilson, M.E., and Carlos L. McMaster, B.S. in C.E. East Lansing, Mich.: Published by the authors, 1908. 8vo.; 160 pages.

Of making books on drawing there is no end. The present work contains some unique features, such as machine sketching, which is most admirably treated. The section relating to lettering is also good.

A SHORT HISTORY OF ENGRAVING AND ETCHING. For the Use of Collectors and Students. By A. M. Hurd. Boston: Houghton, Mifflin Company, 1908. 8vo.; 473 pages. Price, $5.

A beautiful book, illustrated by 110 engravings and a frontispiece in photogravure. There is a full bibliography and a classified list and index of engravers. The selection of examples is well made. The extensive classified list of engravers is a monument of patience. Collectors will hail this book with delight.

KRAFT. By Prof. Dr. E. Reyer. Leipzig: Verlag von Wilhelm Engelmann, 1908. 8vo.; 380 pages. Price, $1.50.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending October 27, 1908,

AND EACH BEARING THAT DATE

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

Acetylene generator, E. E. Taggart 902,023
Acid, apparatus for treating oleic, P. Schwoerer 902,177
Acid, celestin blue sulfonic, W. Lommel 902,154
Acid, producing phosphoric, F. J. Maywald. 902,157
Adding machines, printing eliminating device for, C. Wales 902,125
Addressing machines, town marker for, S. C. Cox 901,954
Air brake quick action automatic release mechanism, J. E. Normand 902,161, 902,182
Air brake systems, valve mechanism for railway, J. E. Normand 902,163
Air brakes, high speed reducing valve for, W. V. Turner 902,182
Air brakes, high speed reducing valve for, Turner & Custer 902,183
Air from siphons of sluices and the like, device for exhausting, C. Havestadt 902,077
Alternator, inductor magneto, L. Le Pontois 902,499
Aluminous materials, treating, Saunders & Petrikin 902,255
Amusement apparatus, C. H. Gueritey 902,073
Anchor, vessel, W. I. Babcock 902,046
Animal bench, folding, R. C. Rathborne 902,508
Animal catcher, C. B. Cruse 902,057
Animal trap, J. Shepherd 902,005
Annealing furnace, E. E. F. Creighton 901,956
Arc lights, carbon pencil of electric, J. Nicholson 901,993
Ash receiver, Voska & Nelson 902,511
Auger, post hole, H. Hermanns 902,294
Automatic gate, A. T. Lister 902,095
Axle bearing, C. M. Doritty 902,058
Axle skein, S. K. Dennis 902,214
Baking pan, sanitary, W. H. Perry 901,999
Ballot box, computing, C. A. Ball 902,365
Balls, manufacture of tennis and similar playing, F. Rowley 902,330
Band cutter and feeder, E. M. Kramer 902,237
Band cutter and feeder, W. J. Footitt 902,391
Bar. See Tracker bar.
Barrette or hair retainer, J. W. Nichols 902,317
Bedstead corner fastener, A. E. Irelan 902,085
Bedstead, metallic, C. Netzel 901,992
Bell, electric, C. H. North 902,105
Belt, G. Fouillaron 902,224
Belt attachment, link, J. Eklund 902,524
Belt coupling, D. Chase 901,952
Beverage cooling and dispensing apparatus, Schneider & Ziehn 902,333
Bilge bodies, shaping, R. W. Hardie 901,963
Billiard table and the like, F. Hepton 902,151
Binder, loose leaf, W. M. Wheildon 902,189
Blacking machine, shoe, W. C. Ford 902,390
Blower or compressor, rotary, Ostergren & Cardell 902,441
Boats, davit supporting means for sharp stern, J. E. Robbins 902,452
Boiler furnace, J. R. Surrell 902,265
Boiler tube cleaner, E. J. McCarty 902,315
Bolt and latch releasing device, door, L. Jones 902,412
Bottle, vacuum, Friedrich & Lyman 902,528
Box, Doyle & Schmitt 902,483
Box clamping machine, J. B. Ireland 902,491
Box fastener, Long & Campbell 902,241
Box making, work holder for, W. H. Holland 902,230
Brake cylinder, duplex, W. V. Turner 902,185
Brake hanger, non-chattering, W. Dalton 902,477
Brake shoe, S. P. Bush 902,206
Brake system, fluid pressure, W. H. Sauvage 902,114
Breech mechanism, S. A. S. Hammar 902,487
Brooch, C. N. Bruzaud 902,274
Burglar alarm, C. A. Metzger 901,983
Bushings, device for extracting, G. M. Coursen 902,475
Cable tip, L. Kellner 902,235
Calculating machine, E. Leder 902,498
Calculating machine for money and similar objects, M. G. Froberg 902,067
Calculating machines, power transmitting mechanism for, C. N. McFarland 902,103
Calendar, J. Ferreres 902,484
Calipers, micrometer, F. O. Jacques, Jr., 902,492, 902,493
Canceling device, hand, H. R. McFarland .. 902,436
Car body, Heulings & Smith 902,402
Car brake, railway, S. A. Crone 902,137
Car coupling, H. H. Paulson 902,442
Car fender, D. E. Conn 902,210
Car gate, passenger, W. H. Heulings, Jr.. 902,489
Car grain door, J. Edman 901,959
Car guard rail, passenger, S. T. Bole 902,368
Car mover, C. H. Shotwell 902,336
Car, passenger, Curwen & Smith 902,381
Car, passenger, H. Howson 902,405
Car, passenger, R. H. & M. E. Moore 902,431
Car safety appliance, street, L. M. Maxham 902,156
Card making machine, A. L. Hemphill 902,488
Carriages, umbrella support for, Williams & Conner 902,459
Carrier system, J. J. Meyer 901,984
Cattle guard gate, J. Adams 902,518
Centrifugal separators, flexible neck bearing for, C. A. Edlund 902,282
Chain, drive, W. F. Brown 902,205
Chain wrench, A. M. Tilton 902,025
Chalk holder, H. T. McCune 902,435
Chuck, P. A. Whitney 902,191
Cigar box and lid, W. J. Farrell 902,140
Cigar cutter, E. Salzer 902,171
Cigar cutter and match deliverer, E. Salzer 902,170
Cigar holding receptacle, J. P. Bergeron 902,521
Cisterns, ventilating cover for, Gribben & Mohr 902,289
Clutch, friction, M. L. Williams 902,515
Cock coupling, E. Witzenmann 902,192
Coffee after the same has been graded, mechanism for cleaning and finishing ground, F. Conner 902,474
Coin controlled lock, F. W. Kassler 902,086
Coke drawer, Martin & Macfarren 902,243
Collapsible stand, J. W. Kline 902,089
Column, C. T. Cunnius 902,209
Column base, G. L. Preacher 902,448
Commode, L. W. Price 902,449
Commutator for dynamo electric machines, F. H. Loring 902,424
Compasses, drawing, G. Schoenner 902,257
Concrete construction, R. T. Brown 902,204
Concrete construction, F. Melber 902,311
Concrete structures, reinforce for, J. M. Sherwood 902,335
Conduit, J. A. Garey 902,285
Confectioner's box, C. E. Hawxhurst, Jr.. 902,540
Container, F. B. Davidson 902,213
Conveyer, W. K. Liggett 902,421
Conveyer, C. O. Gustavsen 902,530
Cooking utensil, F. Robinson 902,111
Cooking utensil, H. Tidow 902,181
Core box, A. H. Kudlich 902,304
Corn sheller, W. H. Holsclaw 901,968
Cotton chopper, J. T. Hamilton 902,075
Cotton chopper, W. D. Lindsley 902,500
Cotton chopper and cultivator, J. H. Dunn. 902,385
Cotton picking finger, T. J. Gray 902,227
Coupling. See Belt coupling.
Crate, collapsible, H. C. Hunter 902,408
Cultivator, J. W. Osborne 902,107
Cultivator, harrow, and rake, combined, Benton & Jordan 902,367
Cultivator harrow attachment, G. Trompeter 902,123
Culvert, reinforced cement, C. D. Voris ... 902,027
Current collecting means, C. Macmillan ... 901,976
Curtain fixture, F. L. Egbert 902,386
Cut out box, T. Q. Andrazyk 901,939
Damper, W. D. Luce 902,098
Dental apparatus, F. Armstrong 902,463
Dental finger tray, J. G. Powell 902,109
Differential mechanism, E. Aze 902,045
Dike, movable, J. A. Cameron 902,372
Dish washer, C. W. Fetherolf 902,064
Door and gate hanger, H. Todd 902,348
Door hanger track, H. L. & H. J. Ferris.. 902,221
Door lock, sliding, Bentley & Chessher 902,520
Dough cutting machine, C. J. Kintner 902,088
Draft rigging, W. D. Lowry 902,242
Drain and backwater trap, floor, W. Weiler. 902,030
Drain inlet, tile, H. N. Neireiter 902,104
Drawers adjuster and supporter, E. H. Wood 902,460
Drawers supporter, E. H. Humphrey 902,407
Drill, F. E. Snyder 902,008
Driving and driven members, safety coupling for, F. H. French 902,527
Driving mechanism, flexible, W. Dalton 902,523
Drum beating apparatus, E. E. Pettingell .. 902,444
Dye and making same, black sulfur, G. E. Junius 901,970
Dye, azo, P. Volkmann 902,186
Dyes containing fatty acid radicals, making azo, N. Sulzberger 902,021
Dyeing apparatus, H. Anner 902,271
Electric cell, G. Schauli 902,173
Electric conductor carrying current, method of and means for utilizing the pressure in the interior of an, E. F. Northrup .. 902,106
Electric controlling device, H. W. Leonard. 902,307
Electric fixture, E. C. Suiter 902,121
Electric heater, E. Thomson 902,024
Electric machine, dynamo, K. Sulzberger, 902,019, 902,020
Electric machine, dynamo, A. B. Field 902,065
Electric sparking device, W. H. R. Mildebrath 902,427
Electrically controlled lock, F. W. Marvel .. 902,244
Electrode for arc lamps, W. R. Whitney ... 902,354
Electropneumatic brake, W. V. Turner 902,184
Electrotype molds, preparation of, A. W. Harrison 901,965
Electrotype molds, solution for treating, A. W. Harrison 901,966
Elevator, S. Bruce 902,371
Elevators, guide greaser for, T. F. Goodrich 902,226
End gate, wagon, W. H. Palmer 902,319
Endoscope, R. H. Wappler 902,513
Engine starter, L. S. Tuttle 902,350
Engines, electric circuit controller for internal combustion, C. Cuno 902,522
Envelop, H. L. Staley 902,341
Envelop, J. A. Cheape 902,375
Envelop machine, Flagg & Smith 902,222
Envelop, safety, I. Klein 902,301