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 This is for our information and not for publication.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.

(8098) L. J. J. writes: 1. I have a small fan motor of 52 volts, ⅛ horse power, alternating current, which I run on direct light current, 52 volts. It has a great deal of power, but sparks a great deal. Could you advise me in the next issue of your valuable paper how to prevent this? A. Your alternating-current motor, when put on a direct current, gets more current than it could get from an alternating circuit. It therefore runs faster and sparks more than it should. The brushes are perhaps not in the proper position. Slide them to and fro around the commutator, and find the position of least sparking. If this does not cure the trouble, you can add a resistance to the external circuit, so as to cut down the current which enters the motor. 2. Why will it not generate when run by an 18-inch fly-wheel? It goes very fast. A. Many of the small motors cannot excite their own fields and build them up. They cannot, for that reason, be run as generators. 3. Should telephone be grounded on house or earth side of gas meter, and why? A. It is better not to ground anything to a gas-pipe, either side of the meter. A flash of lightning or a lightning wire falling across the telephone wire might produce a spark which would set fire to the gas and to the house. Perhaps the earth side of the meter is a little better ground than the house side.

(8099) F. T. asks: 1. Can water be decomposed and the gases collected separately by an alternating electric current? A. No: the gases will be mixed at each pole in the same proportions as they are in water—hydrogen 2 parts, and oxygen 1 part. 2. What chemicals are most frequently used in a dry battery? A. Dry cells are usually modified Leclanche cells. The sal ammoniac solution is held in some absorbent material, so that it will not run out of the cell when it is upset. 3. In the preface of Tesla's "Experiments with Alternating Currents of High Potential and High Frequency" it mentions a thermo-magnetic motor he devised. What was the principle of it? A. A thermo-magnetic motor, or, as it is usually called, a pyro-magnetic motor, consists of an armature formed of a disk or ring of thin steel, which is set in motion when unequally heated by reason of the difference of force so produced. Mr. Edison invented a pyro-magnetic generator which acted on the fact that iron ceases to be magnetic at about 770 deg. C., and converted the heat energy by means of it into electric energy. He used a thin iron tube in a strong magnetic field surrounded by a coil of wire. By varying the temperature of the tube near 770 deg. he varied the magnetism passing through the coil, and thus produced a current in the coil. 4. Can a storage battery be charged by an alternating electric current? A. No. 5. What is a thermostat? A. An instrument which closes or opens an electric circuit when heated or cooled.

(8100) J. M. A. asks: 1. A condenser, i. e., a double-convex lens, will throw a focus of ½ inch in diameter, which gives a heat of 500 deg F.; what will another condenser of twice the diameter, but of the same focus, give in heat? A. The area of the larger lens is a circle of twice the diameter and four times the area of the smaller. It will allow four times as much light and heat to pass through it. 2. Is the intensity of the heat as the square of the diameter? A. The quantity of heat is proportional to the square of the diameter of a lens through which it is transmitted. The intensity of heat in a focus is approximately so also. Whether a piece of metal, such as a mercury thermometer or a piece of copper, will be heated to a higher temperature, and how much higher, depends upon the specific heat of the metal and upon its condition as regards radiation. It is difficult, if not quite impossible, to determine to what degree of a thermometer a given quantity of heat will raise a piece of a given metal. 3. Will the same rules hold good for a parabolic reflector as for a condenser? A. No; a parabolic reflector sends the rays out in a parallel beam when the source of heat or light is placed in its focus. The intensity does not then diminish as the square of the distance. 4. Is there any book published on the collecting and applying heat from the sun's rays and on the storage of such heat? A. Langley's "New Astronomy," price $3 by mail, contains a chapter on this subject. It shows pictures of the several solar engines which have been used at various times in the effort to find a mode of utilizing the great heat of the sun. We have published several articles in the Supplement on the subject of solar energy; No. 13, by John Ericsson, who devised a solar engine; Nos. 212, 214, 216, 217, 218, by Prof. Langley; price ten cents each.

(8101) J. E. H. writes: If a machine at a revolution of say 2,100 gives an electric current of 3 amperes at 10 volts, what is the most practical way to get a current of ½ to 1 ampere at 10 volts from it? If through coils and a reduction of speed, please give size of wire used and number of turns for each spool. A. The current a machine gives depends on the resistance of the external circuit. If you have three amperes through a certain circuit, to have one-half as much double the resistance of the external circuit. With 10 volts, the current will be 3 amperes when the resistance is 3 1-3 ohms. For one ampere the resistance must be 10 ohms. Now, if you have a part of the 10 ohms in the apparatus used, you will only require the rest of the resistance in a coil. No. 24 German-silver wire has a resistance of one ohm to three feet. From this you can calculate what you need.

(8102) O. M. S. asks: 1. I want to put up a telephone between my place and a neighbor's about a half a mile distant. I have two receivers, dry and bichromate batteries. Now, can I put up a telephone by connecting the receivers and battery, one at each end, to a barb-wire fence, in which the wire is fastened uninsulated to the post by staples, and use common electric alarm bells? A. Yes; if the wire is continuous, without breaks or loose joints. It must be spliced as strong as a telegraph wire. Such an arrangement will work only when the fence is dry. 2. If this can be done, please tell me how to connect the batteries and receivers to the fence. A. Connect the batteries and receiver to the line in series. Put half of the battery at each end of the line, using care that the poles at each end are in the same order. 3. How much power will be needed? A. We cannot tell. A great deal more than with an insulated line. 4. Can dry batteries, when the current gives out, be restored? If so, how? A. No; they can be opened and filled with sal ammoniac solution, running them as wet cells till the zincs are used up. 5. How can you magnetize a piece of iron by using a magnet? A. A piece of iron cannot be permanently magnetized. It is made into a magnet by bringing one end to the end of the permanent magnet.

(8103) J. M. S. asks: 1. In making an electric furnace, there is a core of fire-clay wound with platinum wire and then covered with clay and asbestos and connected up with a rheostat. Is there anything but platinum wire used, or do they cut in a fiber similar to that used in an incandescent lamp? A. You seem to be describing an electrical heater, and not an electrical furnace. The electrical furnace is made by bringing two carbons into contact and then drawing them apart while they are covered by the substance to be treated in the furnace. A very high temperature, which will melt any substance, is thus produced. A platinum wire wound on fire-clay can hardly come under the designation of an electrical furnace. In such a heater as you describe there would be no advantage in using a carbon filament. 2. In making a controller to reduce electric current (107 volts, alternating), what size of German-silver wire is used, and how long should each space be to the branches, so as to reduce same to 2 volts, 3 volts, 4 volts, 5 volts, 6 volts, 7 volts, 8 volts, and 9 volts? A. What you want is not a "controller," but either a transformer or a choking coil. A controller is used with a direct current. A choking coil can be arranged with branches so as to give the various drops in voltage which you mention. We cannot give you a design for this, as we know nothing about your current, except the voltage, nor what you wish to do. Apply to the company furnishing the current for the apparatus. 3. Could I use the insulated German-silver wire, and splice in short pieces the required distance, and then wind same up in a ball, leaving the various ends protrude, connect each up with a button, and use switch leaves, with button, that correspond to the voltage desired, without danger of burning same out? Am using 107-volt, 1,200-ampere, alternating current. A. No; a rheostat becomes heated by the current which flows through it. This would burn the insulation. Wound into a close coil, the wire would be still more heated than if wound into a spiral. Resistance coils are wound into open spirals, and placed so that air can draw through them and keep them cool.

(8104) F. J. S. writes: To have a current we need two different substances united by two contacts—one liquid, one metallic. Such a case occurs in an ordinary zinc cell when a particle of iron is embedded in the zinc surface. This wasteful circuit is done away with by amalgamating. But does not this evil effect (local action) necessarily exist in the storage battery? There is the metal grid in immediate contact with the oxide, and at the same time in contact with it through the intermediary of the liquid. Thus it would appear that there ought to be a vast amount of local action all the time. A. There is no local action in a storage cell. The only action on open circuit is the slight formation of lead sulphate by the combination of the lead and sulphuric acid. This is a very slow process. The action of a storage cell is between the peroxide of lead and the spongy lead on the negative plate.

(8105) L. A. G. asks: 1. In the telephone-magneto generator described in Supplement, No. 966, could the steel magnets be charged by simply placing them against one of the poles of the magnet of a powerful dynamo, or would consequent poles result? A. Permanent magnets are best magnetized by a coil of wire through which a current of electricity is flowing. Pass the magnet steadily through the coil back and forth. 2. When constructed as directed in the Supplement, through what distance will the generators ring? That is to say, how many thousand ohms will the generator be? A. We do not know. 3. Could you also give me a good formula for a red and a black pigment or enamel for painting the generator magnets with? A. Any good varnish paints will do. 4. In the Hunning's telephone transmitter described on page 813 of "Experimental Science" (next to last edition), how fine and how hard packed should the granular carbon be? Would a carbon diaphragm and carbon back give better results than a brass back and ferrotype diaphragm? A. The carbon grains of proper form and size can be purchased of manufacturers of telephones, for which see our advertising columns. The packing should be adjusted to clearest transmission by experiment. 5. Can the small alternating dynamo described in the Scientific American, Vol. 77, No. 11, be made self-exciting and still give 110 volts? How? A. No; there is not room on the armature for a commutator. You can redesign the yoke, etc., and put in a direct-current arrangement. 6. Would you furnish me with a list of the articles that have been published in the Scientific American (not the Supplement) on the telephone and the dynamo? A. Many details of the telephone are described and illustrated in Supplement, Nos. 142, 163 and 966. Illustrated articles, giving complete details for the construction of small dynamos, are contained in Supplement, Nos. 161, 599, 600, 844 and 865. We supply the Supplement copies at ten cents each. For a list of many general articles on these subjects, we refer you to pages 13 and 17 of the Supplement Catalogue, which we supply free on application.

(8106) F. M. writes: Some two or three weeks ago, in Notes and Queries, you said water was a non-conductor, since which time I have got into all kinds of trouble by making this claim. Please explain how a fireman in Kansas City was knocked over the other day when the stream from the metal nozzle came in contact with a live wire. Also the old trick of trying to get a piece of money out of a bowl of water connected to a battery; why wetting the hands before taking hold of an electro battery will intensify the shock. A. We regret that you have been brought into trouble by inability to defend our statement that water is a non-conductor of electricity. Yet such is the fact, without any qualification. But the water must be pure, of course. Any impurity immediately lowers the resistance of the water very greatly. All the cases you cite are of this character. A man's hands are not ordinarily clean, never chemically clean. Should they be made so and dried, the first traces of perspiration would bring with it salt, and this is a good conductor. Dry hands are very well insulated by the skin. We never heard of any difficulty in taking a coin from a bowl of water connected to a battery. If the bowl were connected to a charged Leyden jar, there would be a shock on touching the water—ordinary water. Thompson, in his "Elementary Lessons in Electricity," gives the resistance of pure water as 265,500,000,000, when the resistance of copper is 1.57. Now, divide the large number by 1.57, and you will have the fact that pure water has 1,777,777,777, or, roughly, one billion and three-quarters times as much resistance as copper. Glass has only about 1,000 times the resistance of water, and glass is one of our best insulators. Now, add 5 per cent of sulphuric acid to the purest water and its resistance drops 500 times. A water resistance is a very common thing in electrical works nowadays. We hope these facts may enable you to discomfit your adversaries.

(8107) R. D. T. writes: I have made one of the motors described in Scientific American of December 8 and 15, 1900, and mounted same temporarily on wood bearings. Have tried three cells of open circuit battery in series (and multiple arc), but can get no effect whatever. Field is not short-circuited. A few questions. 1. Ought there not to be some effect with two or three cells when motor is mounted as above? A. Yes. There ought to be plenty of magnetism in the field and a spark at the terminals on breaking the circuit. 2. How can I test the armature and windings, not having a galvanometer? A. Connect one end of the winding to the battery, and try with a wire from the other pole of the battery whether a spark can be obtained from the iron of the armature core, or the yoke of the machine. This will show if the winding is grounded on the machine. 3. Would introducing a compass in place of armature and brushes demagnetize the compass when current as above is turned on? A. No: it would make the compass stronger. 4. Why should armature revolve by hand as easily one way as another when field is not short-circuited, with three cells of wet battery like Leclanche open circuit? A. Probably because there is no current flowing. It seems as if you have no circuit through the motor. Perhaps you have connected up the field magnet so that the two halves neutralize each other. 5. Where can I get the brass balls necessary? A. You cannot purchase solid brass balls. We think you will have to make them.

(8108) L. A. D. writes: I have trouble with my photo plates in the fixing bath, which takes off the black and leaves the plate gray. Fixing bath used is 1 ounce hypo. to 3 ounces of water. I wish you would help me out. I develop the plates a good black in the high lights, but after fixing they are gray, with no contrast. Please give me a receipt for a fixing bath which will not destroy the high lights. A. The trouble with your photo plate does not, probably, lie with the fixing bath. This does not take away the black and leave them gray. They were thin before they went into the hypo. The trouble is over-exposure or under-development. The best formula for any plate is the one given by the maker in the box of plates. You cannot improve on that. Expose a shorter time and find by experiment what the proper time is for exposure.

(8109) J. M. S. asks: 1. How are electric furnaces (for dental uses, fusing porcelain, alternating current) wound? I am informed that platinum wire is used, but is that all? Is not there something similar to the fine film or carbon used in incandescent bulbs connected in to avoid burning out a fuse? A. The heating furnaces which have recently come into use are of platinum wire, wound on a non-conducting core. The resistance is made such that the proper current flows without fusing the platinum, and no external resistance is employed. The limit of temperature is the melting point of platinum. 2. Would there be very much expense in changing a motor from alternating to direct? A. A commutator is required in place of the collector rings. Its cost depends on the number of bars required in it. 3. Is it possible to charge a storage battery from an alternating current? A. No; except the alternating current is used to run a rotary converter. 4. There is an electric appliance out for annealing gold foil, used by dentists. Can you tell me how it is made? A. We have no information about this heater.

(8110) T. D. asks: What is the voltage of the Edison-Lalande battery, type "W?" A. The manufacturers, in their catalogue, give 0.667 volt as the mean working E. M. F. of a cell.

(8111) W. O. E. asks: Please tell an old reader of the Scientific American what is the specific heat of hydrogen gas at constant pressure and constant volume. A. The mean specific heat of hydrogen at constant pressure is 3.4062, on the authority of Regnault and Wiedermann. The calculated specific heat at constant volume is 0.2419, by some authorities; by others it is given as 0.2359.

(8112) C. & Son write: We desire to melt a small amount of iron for experimental purposes, not sufficient to pay for a cupola. Can you give us any information on the subject? A. You can melt 3 or 4 pounds of cast iron in a black lead crucible in a forge fire by building up a loose brick furnace around the tuyere, with about 3 inches clearance around the crucible.

(8113) G. E. C. writes: Am thinking of making the mercurial barometer described in Scientific American, February 2, 1901, page 74. Would like to know how many ounces of mercury I should get, and what it will cost. A. Not more than a half pound is actually required, but a pound will make the work easier.

(8114) J. B. Co. asks: In your issue of December 1 you describe and illustrate artificial lightning. Will you put us in the way of getting specific information as to the amount of current necessary to operate one of these signs? Our commercial current is 500 volts, 104 and 110 volts. A. We do not know any way in which so strong an effect can be produced directly by 500 volts of pressure. Ten times as much pressure is desirable. It can be obtained by a powerful transformer.

(8115) R. D. asks: Will you kindly give me a description of the secondary section windings of induction coil, such as Rietchie, in Boston, uses for his coils, or is there a book written on this subject which gives full information regarding such windings and sizes of wires used? A. The making of a modern induction coil, with the secondary in sections, is fully described in Supplement No. 1124, price ten cents. The dimensions of all parts and sizes of wires are plainly given.

(8116) E. P. R. writes: In testing the small disks as they are wound (in making a Ruhmkorff coil) I use the galvanometer and battery of sufficient strength to deflect the needle, to tell whether the wire is broken or not in winding. I have the battery and meter connected up and have two clamps to attach to the terminals of the coils when testing. I noticed that at times the needle would deflect one way and then the next time it would deflect just the opposite to what it did before: and as I knew that the current was passing through the meter in the same direction at all times, I made an investigation and found that if I connected the outside terminal of

the disk to the wire from the battery and the inside terminal to the wire from the meter that the needle would deflect one way, and by connecting them just the opposite the needle was deflected just the opposite as to what it did before, just the same as it would had I changed the direction of the current through the meter, which I did not do. I made several tests, with the same result each time. I have never heard of anything like it before, and do not know whether I am in the wrong or not about the matter, but can see no reason for the needle to change. Will you kindly explain, if it is worth an explanation? A. In the second mode of connecting the coil to the battery and galvanometer the current flows through the coil in the opposite direction from which it flowed the first time. The poles of the coil are therefore reversed. It may be that the coil is so near to the galvanometer that its needle is deflected by the coil. We do not see any other way in which the deflection of the needle should be reversed.

(8117) G. G. A. E. asks: 1. How can you determine the size of wire to be used in different circuits? Is it according to the capacity of the wire and the requirements of the instruments or to some other rules? If so, give the principal rules. A. The wiring of a circuit is determined by the current it is to carry, the drop to be allowed in it, etc. The tables of the Underwriters are the general guide for size of wire. You will find Cushing's "Wiring Handbook," price $1, by mail, a good book on the subject. The edition for 1901 is just out. 2. How many candle power can a 75 watt dynamo, capable at 1,400 revolutions of producing 15 to 20 volts, and at 2,000 revolutions 40 to 50 volts, furnish? Also, how the candle power could be divided up into seven different lamps in order to get best results? A. Two and a half to four watts are to be allowed per candle with small lamps. With 75 watts you can have 20 to 30 candle power. If you have 7 lamps on 20 volts, you will have about 3 volts for a lamp, and you will need 1 candle power lamps, 7 in a series. At 50 volts you can use 7-volt lamps, and can have 2 candle power lamps, in series. 3. Which do you think is the better for both general and accumulator use—the series or the shunt-wound dynamo? A. A series dynamo is not adapted to the work of charging storage cells. Use a shunt-wound machine. 4. Can dry batteries, when exhausted, be used for accumulators; and, if so, how many would be required for the above dynamo? A. We know of no way to use dry cells as accumulators.

(8118) J. K. asks: 1. How can I make a core for an induction coil, for medical use or igniting use? A. The core of an induction coil for any purpose consists of a bundle of iron wires, covered with paraffined paper or other insulation. Upon this the primary coil is wound. Full instructions for winding a medical coil are given in Bottone's "Electrical Instrument-Making," price 50 cents, by mail. 2. Can an incandescent light be produced without a dynamo; and, if so, how? A. Yes: a small lamp may be lighted by a primary battery. 3. How can I construct a small electric motor for running small machinery? A. Follow the directions given in the SCIENTIFIC AMERICAN SUPPLEMENT, 641, 759, or 1210, price 10 cents each.

(8119) A. McD. asks: Is there a water motor used to run a dynamo? Is it a success? A. A dynamo can be run by water power as well as by steam. It is necessary to secure steady motion by a steady pressure of the water. For water motors see our advertising columns.

(8120) B. G. J. asks: 1. To change an alternating current that now has a pressure of 50 volts to one of 115 volts, what effect would the increased pressure have on conductor and the rubber insulation, the present conductor having the capacity of 10 amperes? A. No appreciable effect. The difference between the voltages is too small to make any difference. 2. Would it be necessary to increase the size of the conductor? A. No: the conductor could be diminished if any change were to be made in it for the same current. The higher the voltage the smaller the conductor needed to carry a given amount of electricity. 3. Are transformers made to step down 5,500 volts to 115 volts? A. Yes; such transformers would be supplied by any company furnishing current at this pressure.

(8121) A. W. P. asks: 1. What is the object in having a vacuum in coherer tubes? A. It is not necessary to have a vacuum in the coherer tube for wireless telegraphy. 2. What kind of burner should be used with acetylene gas to obtain a hot blue flame for laboratory work? A. A party claims to have a jet which will produce a colorless flame with acetylene and burn safely so long as it is properly used. It is unnecessary to say that mixtures of air and acetylene are explosive, and unsafe. We are not informed how the burner in question is constructed. 3. How do the following rank as insulators: Hard rubber, paraffin wax, paraffin oil, dry shellacked wood, glass? A. We are not able to give any exact figures of relative resistance of the various insulators. Much depends upon the temperature and condition of the substance. All become fairly good conductors as soon as chemical change begins. Glass conducts as an electrolyte as soon as it softens. 4. If the terminals of a 3-inch spark coil be brought close up to opposite sides of a large cake of paraffin wax 1 inch thick, would there be any appreciable flow of current through the paraffin? A. No. 5. In experimenting with wireless telegraphy and electric wave radiation, could wooden balls, covered with tinfoil, be used in the oscillator in place of the brass spheres usually employed for such purpose? A. It was at first thought that the surface of the balls must be most highly polished for use as transmitters, but this is no longer done. Whether so rough a body as tinfoil would transmit at all or not we cannot say. You can make experiments and find out the result. 6. To what extent will zinc sulphide fluoresce under the influence of Roentgen rays, as compared with calcium tungstate? A. We are not aware that zinc sulphide has been used at all for fluorescent screens. If it is serviceable for that purpose it would drive out calcium tungstate, since it is very much cheaper.

(8122) C. J. B. asks: Is it possible to enlarge a photograph by projection? By this I mean to insert a negative in the camera, behind which there is a source of light, in place of a plate and project the image on a piece of rapid paper. I tried this several times and could get nothing more than reduced silver on the paper. A. It is possible to make an enlargement in the manner described, if properly arranged. The operation must be performed in a room entirely dark, so that no light can strike the paper except that which passes through the negative. The light must be in a box from which no light can escape into the room. A ground glass, or opal glass, or oiled paper must be put between the light and the negative to diffuse the light and prevent a flare spot from forming in the focus of the lens. If a perfectly distinct and sharp image of the negative can be seen on the paper a photographic positive can be made on the paper by giving the proper exposure. An exposure much longer than to daylight will be required, of course, since any artificial light is weaker than daylight. Bromide enlargements are made very often in this way. The best way, however, to make an enlargement is to use a camera with two bellows, with the lens in the middle between the bellows, with a holder for the negative at one end and the plate holder at the other end. The bellows are longer than they are in ordinary cameras, to give room for making enlargements of various sizes. Such cameras are sold under the name of Copying Cameras. An ingenious person can make an attachment for an ordinary camera which will answer the same purpose.

(8123) L. P. R. writes: I wish you would publish through your paper the several causes of knocking in rail joints. A. The knocking at rail joints is caused by the wheels striking a depression at the joint of the rails, made by a separation and the wear made by the wheels rolling over the joints. An additional cause may also come from loose fish-plates, which allow a slight depression of the end of the rail that the wheels are passing off, when the wheels will strike the elevated end of the next rail, and thus make a slight depression at the joint.

(8124) H. D. W. asks: 1. Can you give me any formula for an induction coil suitable for running a wireless telegraph? A. A coil is described in SUPPLEMENT 1124, price 10 cents. The coil is put to its strongest spark by adding cells of battery. Six or eight cells should be sufficient for the coil named above. 2. Is it known how Tesla gets his 100-foot spark. A. We presume by one of his oscillators. 3. Would it be any cheaper to make an apparatus like his or to make an induction coil (for 10-inch spark)? A. The coil is much cheaper. A coil giving a 10-inch spark is described in Bonney's "Induction Coils," price $1, by mail. 4. Can you tell me of any explanatory or descriptive articles on wireless telegraphy? A. See Fahie's "History of Wireless Telegraphy," price $2, by mail.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

MARCH 5, 1901,

AND EACH BEARING THAT DATE.

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

Acid making phosphoric, I. P. Van Denbergh 669,271
Adding and printing machine, A. Hoch 669,167
Adding apparatus, F. H. Sandherr 669,286
Adding machine, A. Hoch 669,168
Advertising and vending apparatus, C. A. Yale 669,433
Advertising device, W. E. Fowler et al 669,198
Air compressor, F. J. A. Kindermann 669,118
Album, easel, R. F. Oberteuffer 669,324
Albumen, obtaining, G. Deycke 669,361
Alkali by electrolysis, producing, H. A. Frasch 669,441
Amalgamator, O. Maris 669,422
Back pedaling brake, W. S. Gubelman 669,237
Bale tie, cotton, F. B. Shuster 669,470
Baling press, W. S. Livengood 669,176
Baling press, J. M. Sanders 669,490
Ballot box, registering and canceling, E. K. Tolman 669,190
Band cutter and feeder, J. N. Wilson 669,494
Bath tub, portable, E. Breide 669,070
Batteries and regenerating elements thereof, operating two liquid primary, H. K. Hess et al (reissue) 11,893
Battery. See Secondary battery.
Battery plate or grid, H. C. Porter 669,487
Bearing, J. M. Laffas 669,120
Bearing adjustment, W. H. & H. T. Caldwell 669,436
Bearing, ball, A. Riebe 669,124
Bed, folding, C. S. Page 669,311
Bed, invalid, J. Hanson 669,217
Bedstead attachment, W. R. Baldwin 669,378
Beehive, D. C. Pullins 669,371
Berth, sleeping, W. J. Fieldhouse 669,363
Bicycle, J. G. Hehr 669,201
Bicycle clamping device, J. E. Gundry 669,389
Bicycle crank removing device, F. H. Guenhagen 669,082
Bicycle rest, V. A. Krepps 669,462
Binding device, adjustable, C. H. Teets 669,105
Board. See Ironing board.
Boat carrying and launching apparatus, life, W. F. Powers 669,179
Boiler, W. C. Stewart 669,187
Boiler furnace, W. W. Shilling 669,287
Book section, separable, Gilson & Gleason 669,387
Boot tree or last, King & Pool 669,173
Boring machine, C. W. H. Blood 669,473
Bottle box, H. H. Higham 669,256
Bottle stopper, C. Forbush 669,386
Bottle washing machine, J. H. Reed 669,267
Brake actuating mechanism, W. Wishart 669,406
Bricks for building purposes, machine for laying, J. H. Knight 669,220
Bridge, movable, T. Rall 669,348
Brush, tooth, C. Rose 669,402
Bunk, folding, J. P. Lein 669,175
Buoy, ship's, W. W. Noyes 669,144
Calendar, J. A. Dailey 669,319
Can. See Creaming can.
Can opener, W. A. Hunter 669,322
Can opener, E. D. Woods 669,375
Cap, bathing, I. F. Kepler 669,343
Car brake wheel, T. W. McNally 669,263
Car coupling, C. N. Hunter 669,088
Car door guiding bracket, H. C. Williamson et al 669,296
Car end sill, railway, G. I. King 669,307
Car grip, cable, J. H. Vandegrift 669,314
Car haul, A. M. Acklin 669,111
Carbureter, D. J. Brown 669,317
Carbureter, Carter & Zierlein 669,157
Carbureter, Lane & Davenport 669,309
Carbureter for petroleum motors, De Dion & Bouton 669,408
Cards, piano machine for punching jacquard, V. Royle 669,350
Carpet sweeper, C. J. Shirreff 669,224
Carriage, baby, Lanciaux & Smith 669,418
Carrying hook, J. Legault 669,204
Cash recorder, J. W. Lutz 669,325
Cash register, F. H. Bickford 669,453
Casters, etc., wheel for, G. E. Neuberth 669,122
Cement, apparatus for handling ground finished, W. R. Dunn 669,409
Chain links, making, F. W. Wood 669,109
Chain making machine, F. W. Wood 669,108
Chair. See Folding chair.
Chair, G. W. Archer 669,150
Chair seat, W. Braasch 669,113
Check register, Woodworth & Cowie 669,333
Chuck, self centering drill, M. Kleber 669,202
Churn, H. C. Lent 669,393
Churn, E. B. Jones 669,116
Churn, J. B. M. Winburn 669,432
Cigar mold, I. Brach 669,229
Cigar tip cutter, E. Walker (reissue) 11,895
Cigarette rods and cigarettes, machine for making, H. E. Grabau 669,138
Cithern finger board attachment, W. A. Thaldorf 669,451
Clamp, H. E. Lanpher 669,282
Clock, electric, S. Fischer 669,338
Closet seat cover, Grant & Macpherson 669,215
Clothes drying and sunning device, R. T. Melton 669,368
Cock, stop, Staedeli & Vogt 669,328
Cock, stop and waste, W. Holz 669,481
Coke drawing apparatus, A. M. Bacon 669,377
Collar foundation, E. K. Warren 669,152
Compressing cotton, wool, etc., apparatus for, Lowry & Holmes 669,260
Computing gage, J. Lane 669,395
Conduit for transmitting pressure of main conduits to registers, branch, J. Hillenbrand 669,391
Conveyer, pneumatic, M. J. Foyer 669,491
Cooler or refrigerator, J. H. Davy 669,160
Corn, machine for splitting ears of, W. D. Adams 669,434
Cotton elevating and cleaning apparatus, seed, R. J. Reynolds 669,182
Creaming can, J. L. Riter 669,372
Cultivator, E. E. Hartzell 669,165
Cultivator, C. W. Michael 669,261
Cultivator, riding, Brinkley & Wetrich 669,134
Curler, hair, G. R. Ferguson 669,078
Curler, hair, A. Haug 669,460
Current interrupter, E. Thomson 669,291
Curtain pole traveler, J. H. Hilliker 669,413
Cushion. See Goods packing cushion.
Deckle strap, J. B. Forsyth 669,252
Dental regulator and spacer, H. H. Martin 669,092
Dental vulcanizer and flask, Feltmann & Hartwig 669,197
Distilling and concentrating liquids, apparatus for, Baudoin & Schribaux 669,435
Door check and closer, combined, E. Cliff 669,158
Door or gate, R. W. Gardner 669,320
Draft equalizer, J. Rusk 669,312
Draft hook, J. Carter 669,382
Draftsmen's use, section liner for, H. H. Hill 669,239
Drawing curve made of cardboard, etc., H. A. Swenson 669,270
Drawing in frame, W. L. Keene 669,394
Dredging apparatus, J. C. Whisler 669,192
Dredging bucket, J. F. Morris 669,446
Drilling, boring, or like machines, feed mechanism for, M. Backstrom 669,407
Dumb waiter stop, automatic, Pierce & McMahon 669,266
Eaves trough screen protector, F. Babcock 669,495
Electric circuit closer, coin controlled, W. H. Paine 669,429
Electric current regulating device, W. Emmott 669,362
Electric machine dynamo, N. C. Bassett 669,209
Electric metering system, E. Oxley 669,310
Electric time switch, H. J. Cogswell 669,477
Electric treatment to the human body, local application of, H. Behrendt 669,336
Electrode, battery, G. Heidel 669,085
Electrode plate for electric accumulators, H. F. Hobel 669,240
Electrometer for relay purposes, capillary, Crehore & Squier 669,149
Elevator. See Windlass elevator.
Elevator car brake apparatus, M. L. Mattson 669,093
Elevator safety device, R. B. Gorton 669,388
Engine, J. Boyer 669,069
Engine, E. Nelson 669,215
Engine, F. Stoer 669,290
Engines, electric igniter for explosive, W. F. Davis 669,233
Explosive engine, O. B. Johnson 669,416
Feed trough, portable, S. Stoner 669,226
Fence, F. Lichtfeldt 669,244
Fence post, P. P. I. Fyfe 669,340
File, bill, W. M. Pearse, Jr 669,246
Filter and refrigerator, combined, A. C. Spitznagel 669,127
Filter, rain water, L. J. Brehm 669,278
Fire apparatus, L. W. Gill 669,492
Fire escape and water tower, combination, J. Pullar 669,190
Fire extinguisher, automatic, G. J. Luce 669,421
Fish cleaner, F. W. Shurman 669,353
Fishing reel, Bailey & Parkinson 669,249
Fishing reel, W. Trabne 669,332
Flour bin and sifter, P. Raetz 669,285
Flower pot, H. E. Guyn 669,164
Fluid dispensing mechanism, coin actuated, W. H. Paine 669,428
Flush tanks, device for supplying water to, W. A. Alexander 669,193
Folding chair, A. Baldesberger 669,334
Forging machine, C. D. Rice 669,103
Frame. See Drawing in frame.
Fruit picker, G. W. Hodges 669,169
Fuel and making same, composite, C. O. P. Howell (reissue) 11,894
Furnace. See Boiler furnace.
Furnace for heating metal bars or sheets, Norton & Robinson 669,265
Furnace for heating metal sheets or bars, Norton & Robinson 669,264
Furniture, school, W. C. Hudson 669,482
Gage. See Computing gage.
Gaging templet, J. M. Stansberry 669,186
Game, G. H. Kent 669,139
Game apparatus, C. W. Tarbet 669,374
Gardening implement, N. B. Riddle 669,397
Garment fastener, J. A. Phillips 669,345
Gas burner, J. Franklin 669,302
Gas burner, incandescent, A. C. Swain 669,189
Gas engine, J. Walrath 669,272
Gas generator, acetylene, T. A. Bryan 669,380
Gas generator, acetylene, Le Sueur & Tilford 669,463
Gas, production of compressed, W. Knapp 669,140
Gate. See Tilting gate.
Gate, O. B. Jacobs 669,323
Gate, J. R. Scrafford 669,431
Gear wheel, split, Carlson & Malmfelt 669,211
Gearing, automatic change speed, H. C. Osborn 669,123
Gearing, differential, J. H. Mitchell 669,095
Glass sheets or plates, applying backing material to, W. Butler 669,381
Goods packing cushion, F. B. Read 669,349
Granulating machine, B. T. Murphy 669,465
Graphophone record shaver, C. A. G. Pritchard 669,207
Gun, automatic machine, F. M. Garland 669,236
Gun support, field, Meigs & Stout 669,367
Hair picker attachment, J. Haynes 669,084
Hand hole cover, A. Worthington 669,110
Handle. See Umbrella handle.
Hanger. See Lamp hanger.
Harrow tooth, J. Lanz 669,258
Harvester apron stretching device, H. J. Case 669,232
Heater. See Hot water heater.
Heating appliances, manufacture of electrical, A. Vogt 669,130
Hoe, B. E. Grover 669,163
Hominy mill, W. Stonebraker 669,188
Horse stopping device, J. Brown 669,071
Hose conduit for railways, H. Geise 669,214
Hot air to parts of the body, device for applying, J. C. Hoyt 669,087
Hot water heater, F. A. Clarkson 669,212
Hydrocarbon burner, F. P. Glazier 669,303
Incandescible body, H. Reeser 669,101
Indicator. See Speed indicator.
Inhaler, T. T. Overshiner 669,098
Inking pad, F. Carl 669,074
Inking pad, F. E. Harrison 669,304
Insulated electric conductor and making same, C. P. Steinmetz 669,358
Interchangeable coupling, A. B. Lees 669,090
Invalids, device for handling, C. Stephens 669,450
Iron. See Sad iron.
Ironing board and step ladder, combined, S. H. Williams 669,154
Ironing machine, M. Engelbrecht 669,233
Jar cover, paste, J. B. Davids 669,159
Joint. See Tank joint.
Journal bearing, M. H. Devore 669,378
Journal box, M. W. Hibbard 669,275
Kinetographic apparatus, W. H. Reid 669,493
Labeling machine, package, C. Leffler 669,174
Lamp, acetylene gas, E. N. Dickerson 669,113
Lamp hanger, T. Lindsay 669,283
Lamp, incandescent, J. W. Howell 669,306
Lamp, overhead regenerative gas, W. H. I. Welch 669,404
Lamp, pendent, R. H. Best 669,225
Lamp, physician's electric, P. M. Randall 669,100
Lamp socket, electric, J. H. & H. Trumbull 669,151
Lamps, construction of carriers for globes or glasses of electric, gas, or oil, E. Stanley 669,357
Leather into strips, machine for cutting, J. W. Fore 669,081
Legging, J. M. Braun 669,337
Leveling instrument, J. A. Arthur 669,068
Life at sea, apparatus for discharging and carrying lines for saving, D. G. Martens 669,091
Lightning arrester, H. C. Wirt 669,155
Linotype machine, J. R. Rogers 669,100, 669,401
Locker, R. W. Jefferis 669,171
Locomotive, ice, C. E. S. Burch 669,210
Loom warp stop motion mechanism, W. E. Allen 669,472
Loom weft thread controlling attachment, C. Fuchs 669,339
Lubricator, F. Burger 669,195
Magnetic blow out brush holder, A. C. Eastwood 669,438
Mail box, O. F. Lidke 669,464
Mallet, H. C. Heinrich 669,086
Match boxing machine, Seven & Cahen 669,223
Match splints, machine for assembling, J. C. Donnelly 669,383
Measuring device, liquid, J. H. Quinn 669,347
Mechanical movement, A. Banghman 669,379
Metal from furnaces, etc., and charging said metal into molds, etc., apparatus for withdrawing molten, McRae & Kitto 669,466
Metal sheet at the angles of roofs, etc., corrugated, F. Smith 669,148
Metals by electrolysis, recovering, H. A. Frasch 669,440
Metals by electrolysis, recovering and separating, H. A. Frasch 669,442
Metals, electrolytic apparatus for recovering, H. A. Frasch 669,439
Mining machine, submarine, A. Allen 669,276
Mold. See Cigar mold.
Molding apparatus, W. E. Knox 669,308
Motion converting mechanism, M. E. Stover 669,269
Motion, means for converting, J. Wiesenbach 669,209
Motor, Fuhrmann & Nelson 669,234
Mower, motor lawn, T. & W. H. Coldwell 669,437
Mowing machine, J. W. Latimer 669,259
Mowing machine, J. B. Tougas 669,292
Mowing machine cutting apparatus, L. J. W. H. Giffhorn 669,479
Music spool, compensating, R. A. Gally 669,342
Nail extracting prying bar, A. G. Thom 669,106
Nut lock, E. Rollings 669,184
Nut, vehicle axle, G. E. Stein 669,373
Ores, retort for treating, F. Guiterman 669,411
Ornamenting walls, etc., device for, H. G. Collenburg 669,136
Oven, steam conduit connection, and cooking utensil for use therewith, cooking, W. T. Pearce 669,221
Packing for stuffing boxes, metallic, L. Canmont 669,318
Pad. See Inking pad.
Padlock, E. E. Wendel 669,295
Paper, perforated, A. Kleinfeldt 669,203
Paper serving apparatus, toilet, C. G. Peterson 669,178
Paper stock indenting machine, R. A. G. Ault 669,277
Paper trimming machine, wall, B. M. Allen 669,066
Paper with carbon, etc., machine for coating, F. W. Weeks 669,153
Parabolic surfaces, producing bodies with, A. Krank 669,119
Piano, J. C. H. Sabnell 669,104
Picker. See Fruit picker.
Picture or name plate holder, M. C. Harriman 669,412
Pin or the like for safety fastenings, A. Potts 669,099
Pipe wrench, C. M. Ingersoll 669,483
Planter, check row corn, W. B. Maris 669,493
Planter, seed, W. Sobey 669,196
Plow, E. W. Stark 669,329
Pneumatic despatch tube system, A. W. Pearsall 669,495
Poison containers, protective means for, V. H. Kopold 669,243
Pole or column, tubular, J. Lanz 669,364
Pole, span wire, J. Lanz 669,496
Post. See Fence post.
Pot. See Flower pot.
Power, means for transmitting, J. H. Watts 669,275
Printing floor cloth, etc., machine for, C. H. Scott 669,469
Printing machine, multicolor, I. Orloff 669,484
Printing press, Palmer & Demnead 669,269
Propelling apparatus, F. Weller 669,294
Pulley, belt, P. Klitsch 669,444
Pump governor, A. F. Ward 669,274
Pump regulating device, steam, J. G. Hodgson 669,257

(Continued on page 174)