RECENTLY PATENTED INVENTIONS.

Electrical Apparatus.

TELEPHONE - TRANSMITTER. — DENNIS O'BRIEN, Limestone, N. Y. The principal object of this invention is to increase the loudness of sound in telephones while maintaining their purity. Mr. O'Brien's apparatus employs an elastic membrane in place of the usual diaphragm, on which is secured a thin iron disk which on being vibrated operates a delicate key of a local circuit. The apparatus has some of the functions of a relay and a repeater in that it reinforces the strength of an undulatory current.

Engineering Improvements.

PNEUMATIC WATERWORKS.—E. L. CANNON, Quitman, Ga. The invention relates to that form of pneumatic waterworks in which water is allowed to pass into a closed reservoir through a check valve and a body of compressed air in a separate tank is admitted to the top of the water to force it out of the reservoir through a standpipe. Mr. Cannon in this invention provides important improvements on such systems.

Lighting and Heating Apparatus.

STOVE.—WILLIAM HEVERMANN, Sedalia, Mo. A novel construction is provided in this invention whereby the stove secures maximum heating results by means of a circulation of air and by the introduction of drum sections and tubes. Conical or funnel-shaped centers of the drum section operate as reflectors for the purpose of throwing out the heat.

APPARATUS FOR BURNING HEAVY OILS. —F. COTTON, Sydney, N. S. W., Australia. The object of Mr. Cotton's invention is to combine a heavy residual oil with steam under pressure and subsequently vaporize the oil and decompose the steam so as to produce a highly combustible gas together with a continuous supply of oxygen and thus obviate the necessity for a forced draft.

OIL-STOVE.—J. L. BERGE, Minneapolis, Minn. The invention relates to certain novel improvements in oil-burning stoves. Mr. Berge has particularly in view as an object the provision of a stove which shall have an oil tank arranged compactly therein and a chamber or casing arranged above the tank and provided with passages to allow air to pass through the chamber, such air being heated in its passage.

Machines and Mechanical Devices.

MACHINE FOR OPENING AND CLEANING COTTON.—D. J. WINN, Sumter, S. C. Mr. Winn's invention consists in certain special arrangements of parts acting on the general principle of a cotton cleaning machine invented by Kitson, patent No. 144,394, but having important novel features which, after long experimentation and careful adjustment have been found to accomplish much more perfectly the objects desired.

FRONT-SHEET-DELIVERY APPARATUS FOR PRINTING PRESSES.—A. STOCKER, Des Moines, Iowa. Mr. Stocker is the inventor of an improvement in that class of apparatus which forms an attachment of printing-presses, and is adapted to receive the printed sheet from the impression-cylinder and deliver it upon a receiving-board. Two movable carriages are employed, also various adjunctive parts, and the invention lies in their construction, arrangement and combination.

GLUE-APPLYING MACHINE.—G. A. ENSIGN, Defiance, Ohio. The object of the invention is to provide a new glue-applying machine which is simple and durable in construction, very effective in operation and more especially designed for uniformly applying glue to the faces of disks or other similar articles preparatory to gluing them together.

Of Interest to Farmers.

AGRICULTURAL IMPLEMENT.—D. LUBIN, New York, N. Y. Two patents have been granted to Mr. Lubin for improvements in agricultural implements. The first invention provides in connection with an agricultural implement a simple means for regulating the depth of cut or drill of a machine. This is done by means of a weight which may be shifted along a rail at the top of a machine so as to weight the machine more heavily at the front end or the rear, as desired.

The second invention relates to improvements in agricultural implements of the kind having a plurality of sets of cultivating tines, the implement being so constructed that each set of tines will have an independent vertical movement under varying weight pressure, so that any one tine or set of tines will pass over an obstruction without lifting the other teeth or causing the machine to veer from a straight course.

Railways and Their Accessories.

RAILWAY-TIE AND RAIL-FASTENING.—P. H. QUINN, Corydon, Pa. Provision is made in this invention for securing rails to metallic railway ties. The ties have the form of channel iron and a peculiar key or wedge fastening is employed which secures the base portion of the rail to the tie. This fastening and tie provides a certain degree of elasticity whereby an advantage is obtained in wear and easy running of the rolling stock.

SPARK-ARRESTER.—F. E. ROGERS and E. HOSKING, Commercial Street, Mount Gambier, South Australia, Australia. The essential feature of the invention consists of the affixture of a rotatable screen within the funnel of the locomotive and so situated as to be acted on by the exhaust current. The screen is of such shape and proportions that nothing can pass between its edges and the funnel. The whole of the steam and gaseous products of combustion pass through the leaves of the screen, the sparks being deflected back into the smoke box.

GROUPED-INDICATOR FOR FREIGHT-CAR SYSTEMS.—E. B. JOHNS, Nashville, Tenn. The group system of handling freight consists of grouping each geographical station according to the station or city to which cars are loaded to break bulk. In this way hundreds of stations can be grouped under one head, which is obviously a great saving of labor to the receiving clerk in determining the proper route of shipment. Mr. Johns' invention relates to a group indicator board and attachment which will be found very useful in this system.

Miscellaneous.

TOILET-CABINET.—W. A. J. NEWELL, New York, N. Y. The invention is more especially designed for the use of actors, but applicable generally wherever an electric-light current is available; and it consists in the construction and arrangement of the parts of the case, the electric lights and their connections, and the combination and arrangement of these parts adapted to secure a better light and to secure in one structure an easily-portable case which may be entirely closed and carried or be opened and set up or disposed for use as a combined mirror-stand and cabinet.

INDEX-BOX.—J. A. BEST, Augusta, Ga. The invention is in the nature of a novel index-book by which the overflow of names from the alphabetical divisions allotted to them may be conveniently located and classified and accurately and quickly referred to and by which also the number of pages of an index may be greatly reduced without lessening the number of names to be indexed, securing the largest possible classification of names within an index of minimum size.

CUSHION-TREAD HORSESHOE. — A. A. SPADONE, New York, N. Y. Broadly speaking, the improvement consists of a cushion-tread having a body or length of rubber or other cushion material and a key or anchor embedded in the body or length, the key or anchor being of any desired cross-sectional shape and made of suitable material, which allows the key under the application of pressure to expand, spread or flatten in a way to make the body of cushion material hold itself frictionally within the channel of a shoe.

ANKLE-SUPPORTING SHOE.—A. POSNER, New York, N. Y. The object of the invention is to provide a new and improved ankle-supporting shoe more especially designed for the use of children and other persons and arranged to firmly support weak ankles, to insure perfect comfort, and allow of easily putting the shoe on or pulling it off.

FIRE-ESCAPE.—M. CODY, New York, N. Y. The object in this case is to provide a portable escape, readily placed in position on a building, provided with a convenient descending means, especially serviceable for supporting women, children, invalids, and other persons, and arranged to insure a safe descent from any floor of the building to the sidewalk.

ICE-FREEZING CAN.—E. E. HANMER, Richmond, Va. Provision is made in this invention for forming a cake of ice with lines of weakness and of admitting non-circulating brine to the interior of the ice-freezing can so as to prevent adherence of the cake to the can. A current of gaseous fluid is injected into the water to be frozen for the purpose of removing floating matter, which enables non-distilled water to be used. The can is so formed that the cake of ice may be withdrawn without trouble, after which it may be readily split along the lines of weakness.

TOY.—F. GARRECHT, Idaho City, Idaho. The toy belongs to that class wherein figures are adapted to descend from an elevation on a support and receive rocking movement from the joint action of gravity and the peculiar shape of the support along which they slide down. The present invention embodies novel details of construction which greatly improve such toys.

CRUPPER.—W. W. LYON and J. L. DAVIS, Mount Salem, Ky. The invention relates to that class of cruppers for harness in which the tail of the horse is supported and held in correct position, the object being to so support the tail as to add to the general appearance of the horse and at the same time prevent the tail from hanging to one side, causing it to maintain a central position.

FASTENER.—L. REITER, New York, N. Y. An improved socket part is herein provided for the stud and socket fasteners used on gloves, suspender ends, and in various other connections where two flexible parts are to be releasably connected. The socket part allows greater and easier movement to the resilient parts than in fasteners as heretofore made.

CEMENT-KILN.—S. R. MALONE, Quanah, Texas. The invention relates to kilns for drying gypsum and other materials employed in the manufacture of cement and plaster. Special advantages are derived by Mr. Malone's improved construction which consists of employing two ovens arranged side by side and communicating with each other. In treating wet gypsum both of the end fire boxes are used. With less wet gypsum the fire boxes at one end of the furnace will provide adequate heat. Thermometers located at proper positions indicate the necessity for more or less heat.

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.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 4623.—For first-class manufacturers of wax match-making machines.

For hoisting engines. J. S. Mundy, Newark, N. J.

Inquiry No. 4624.—For makers of paint-grinding machinery.

AUTOS.—Duryea Power Co., Reading, Pa.

Inquiry No. 4625.—For a model for locomotive valve setting.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 4626.—For makers of wooden novelties, such as fruit and vegetable crates and baskets.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 4627.—For makers of screw cider presses in Michigan, Ohio and Indiana.

Mechanics' Tools and materials. Net price catalogue. Geo. S. Comstock, Mechanicsburg, Pa.

Inquiry No. 4628.—For the address of the makers of the Clement gasoline motor.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 4629.—For dealers in electrical apparatus and supplies for scientific experimental purposes.

Let me sell your patent. I have buyers waiting. Charles A. Scott, Granite Building, Rochester, N. Y.

Inquiry No. 4630.—For makers of a blower grain loader and unloader.

Machine Work of every description. Jobbing and repairing. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.

Inquiry No. 4631.—For manufacturers of spring motors.

I have valuable lead and spar property in Illinois and want competent man to develop. Hegan Manufacturing Company, Louisville, Ky.

Inquiry No. 4632.—For a second-hand lathe for a country repair shop.

The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

Inquiry No. 4633.—For makers of patented articles for farmers' use.

Calvert's Perfect Ink Well Stand and Cover. Territory for sale or trade. Automatic dust proof air tight Patent No. 162,961. Calvert & Carson, Guthrie, Okla.

Inquiry No. 4634.—For a portable printing press for use in streets for printing visiting and business cards.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

Inquiry No. 4635.—For lights for examining bays, lakes, rivers, etc.

Contract manufacturers of hardware specialties, machinery, stampings, dies, tools, etc. Excellent marketing connections. Edmonds-Metzel Mfg. Co., Chicago.

Inquiry No. 4636.—For importers of Belgian shot guns.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 4637.—For a second-hand cedar row boat 17 or 18 feet long.

WANTED.—New novelties that are ready for the market. Must possess merit to justify extensive advertising in this and Foreign Countries. *What have you?* Wizard Novelty Co., Inc., 1007 Filbert Street, Philadelphia.

Inquiry No. 4638.—For makers of kitchen utensils or steel stamped ware.

☞ Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway New York. Free on application.

Inquiry No. 4639.—For manufacturers of campo board.

Inquiry No. 4640.—For a maker of glass washbowl and stand in one piece.

Inquiry No. 4641.—For manufacturers of cut, polished and ready-to-mount gem stones, for rings, pins, charms, etc.

Inquiry No. 4642.—For manufacturers of gas arch lamps.

Notes and 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.

(9191) J. F. Du Q. says: 1. If I burn 100 pounds of anthracite coal, and get pure ashes without any cinders, what would be the weight of ashes, pulverized? 2. If I burn 100 pounds of wood, say shavings, what would be the weight of ashes pulverized? 3. If I burn 100 pounds of rag, what would be the weight of ashes pulverized? 4. If I burn 100 pounds of newspapers, what would be the weight of ashes, pulverized? 5. If I burn 100 pounds of leaf tobacco, what would be the weight of ashes, pulverized? A. From 100 pounds of anthracite the ash varies from 6-10 to 3 pounds, according to the particular kind of coal or the time. From 100 pounds of wood the ash varies from 48-100 pound from birch to 1.77 pounds from beech; and 31-100 pound from white pine. We have no data for rags and tobacco.

(9192) J. W. says: I have noticed or believe I have that incandescent electric lamps always burn out at either the positive or negative side, which I do not know. Now, if I should change the wires at the switch occasionally, say once a month, so that the direction of the current through the lamps is reversed, would not the life of the lamp be lengthened? If so, could you tell me how much, and if same is true with alternating current? A. The deterioration of the incandescent lamp is due to the projection of particles of carbon from the filament to the glass of the bulb. This blackens the bulb and decreases the cross section of the filament, so that its resistance is increased and less electricity flows through the lamp. We are not able to say whether this takes place at one pole more than the other or not, in a lamp lighted by the direct current. It could not affect the alternating current lamp, since this has no positive and negative poles. It would not appear that the difficulty would be remedied by reversing the connections. Should you wish to experiment in the matter and find out whether your theory is correct, it is easy to do so.

(9193) J. H. W. says: Will you please answer the following questions? 1. Why are four-cycle gas engines used in automobiles in preference to two-cycle? 2. Could not a two-cycle engine be built that would be perfectly reliable and give more power for less weight? 3. Which wire is proper to connect to the positive plate of a storage battery—the copper or zinc of a gravity battery? A. Four-cycle gas engines are used on automobiles because, in the present stage of gas engine development, the four cycle engine is the most certain and reliable. It may be possible in the future to build two-cycle engines which are equally reliable, but in the present stage of gas engine practice they apparently have not been sufficiently developed, and the automobile manufacturers evidently prefer reliability even at the price of increased weight for a given power. Connect the wire from the copper plate of the gravity cell to the positive pole of the storage cell for the purpose of discharging the storage cell with a gravity battery. The idea is to send the current for charging through the cell in the opposite direction from the current given by the cell in action.

(9194) McC. Mfg. Co. say: We have noticed your article on producer gas, and we would like to have further information about it. If we take a cast iron pot lined with fire-brick and having a suitable lid and piping, and put incandescent coal in the bottom, putting fresh coal on top, can we produce the gas by blowing air in at the bottom? Is it necessary to use steam, or is it done to keep the coal from burning too rapidly? A. In reply to your inquiry regarding producer gas, we beg to advise you that it would be possible for you to make a poor quality of gas which will be combustible, by taking a cast-iron pot lined with fire-brick, having a suitable lid and piping, and blowing air through a sufficiently thick bed of coal, as you suggest. The combustible elements in such a gas would be, first, the volatile hydrocarbons in the coal; and, second, the CO resulting from the imperfect combustion of the carbon. The calorific value of this gas would depend upon the quality of the coal that was used. All of the hydrocarbons would be present unconsumed, but all

of the carbon in the coal would be burned to carbon monoxide, and would, therefore, have but about 70 per cent of the heat value that this carbon had originally. The other 30 per cent of the heat of the carbon in the coal would either be lost by radiation or would go toward raising the temperature of the resulting producer gas. The object of blowing steam with the air through the bed of coals is to utilize this heat and make it available in combustion later. The steam on coming in contact with the incandescent coal is decomposed, abstracting heat from the fire and setting free hydrogen gas, which is available for combustion later, and is present in the resulting gas in addition to all the other component gases that would otherwise be there.

(9195) W. B. M. asks: 1. What size wire is used to wind magnets on relays of 150 ohms resistance? A. Different sizes of wire are used by different makers in winding relays. With the ordinary spools you probably can wind 150 ohms by using No. 32 B. & S. wire. About 1-6 pound will be required. 2. How is the resistance reckoned or measured? A. The resistance of a wire is measured in various ways. The best way is by the use of a Wheatstone's bridge. The details of the method are given in Thompson's "Elementary Lessons." You can most easily obtain a resistance by the use of a table, such as is given in most catalogues of materials. 3. What is the difference between the B. & S. wire gage and the English wire gage? A. There is no rule for expressing the difference between the B. & S. and the English wire gages. The sizes have no common difference by which they can be reduced from one to the other. Number by number the English gage has larger wires. Thus 32 B. & S. is 0.00795 inch in diameter; 32 English, or Stubs, as it is called, is 0.009 inch in diameter.

(9196) C. C. R. asks: Please make out a list of uses for a small hand power dynamo of about 10 or 12 volts. When I close the circuit on my dynamo and turn it, it works hard. How can I remedy it? A. For the uses to which a small dynamo can be put see "Experimental Science" under Hand Power Dynamo. It will do anything which a battery of 10 cells will do. When the circuit of the machine is open, no current is flowing and the machine is doing no work. It therefore turns without difficulty. When the circuit is closed, it is doing work and requires work to turn it. You can remedy the difficulty by opening the circuit.

(9197) G. R. McD. asks: 1. Please inform me whether the voltmeter described in SUPPLEMENT 1215 when calibrated will have equal divisions throughout scale? A. The voltmeter will not probably have equal divisions throughout the entire scale under any arrangement. The difference will be slight, however. 2. Will the substitution of a metal spool for the cardboard spool make the instrument dead-beat? A. If a cylinder of iron is inserted into the coil as in the D'Arsonval instrument, it will become practically dead-beat.

(9198) C. W. D. says: 1. Is a storage battery suitable for electric lighting in a house where only a few lights would be used at a time? The object being to have a light at a moment's notice and at times when it would be inconvenient to run a dynamo. A. A storage battery is the most convenient way to obtain a few electric lights at a time when the generator is not running. 2. Could a satisfactory battery be built by an amateur or would it best be bought? A. It is not to be advised that any one should attempt to make a commercial storage battery for himself. The work requires machinery and experience not usually found in the shop of an amateur. The best forms are covered by patents. 3. About what per cent would be lost by a storage battery of energy? A. The per cent of loss varies. A large battery loses less than a small one. Perhaps you might realize 90 per cent of the charging energy. 4. Would the eight-light dynamo described in SUPPLEMENT No. 600 be suitable for charging such a battery? A. The eight-light dynamo will charge storage batteries. 5. Are all the high-speed gasoline motors satisfactory, and are they very durable with good care? A. Gasoline engines are reliable with good care. 6. Are storage batteries expensive to run after they are installed? A. Storage batteries increase the cost of lighting, since they deteriorate with use as everything else does. It is cheaper to light without transforming the current than to pass it through a storage battery.

(9199) F. S. says: 1. Can any storm originating in the West Indies be properly called a cyclone and improperly a hurricane? 2. What is the difference between a cyclone and a hurricane? 3. I understand the theory of storms is that all wind in motion takes a rotary action opposite to the movement of the hands of a watch. If this is true, are not all storms large or small cyclones? 4. In reading several authorities on the subject of storms, I concluded that a cyclone is more of a theory covering the movement of all storms rather than a distinctive feature of any particular storm. Is this correct? 5. Have the typhoon or simoon any phenomena different from the hurricane other than the locality in which they exist? A. We referred your questions to the Department of Agriculture, at Washington, D. C. The following is a copy of their reply:

"Referring to your inquiry regarding the definition of the terms 'cyclone,' 'hurricane,' etc., I beg to say that all storms in which the wind has a circulatory movement about a central area of low barometric pressure, may properly be termed cyclones. Tropical storms are known in the West Indies as hurricanes; in the Philippine Islands and on the southeastern coast of Asia, as typhoons; and in the Indian Ocean and Bay of Bengal, as cyclones. The general storms of the middle latitudes are usually referred to as simply storms, or areas of low barometric pressure. The 'simoon' is a desert wind, and is caused by the excessive heat of those regions. A tornado, or thunderstorm, is a secondary development that occurs within the areas of the general storms. In the northern hemisphere, the rotary motion of winds in storms is in a direction opposite to the movement of the hands of a watch, while in the southern hemisphere, the rotary movement is the same as that of the hands of a watch. This is true in the case of all storms, whether large or small.—H. E. Williams, Acting Chief U. S. Weather Bureau."

(9200) C. M. S. says: The article in your paper of recent date showing Lottie Brandon "looping the loop" has revived a discussion which we had a few months ago when she appeared in this city, and if it is not too "personal," I would be pleased to have it settled through your "queries" department. Professors and educated men claim that she can really obtain momentum as shown, while I say that the only momentum to start with is in the run of the wheels, and no matter how fast she pedals, her own weight and that of the bicycle frame have no momentum whatever to carry her around the loop, and it is doubtful to me whether she would be carried more than 4 or 5 feet on a level floor. She also makes two revolutions while men riding down the greatest incline can make but one. This again proves her "mechanical" loop. What are the laws governing the loop, and how could the diameter be determined, having given the velocity and weight of moving body, or *vice versa*? A. In reply to your inquiry regarding the principle governing the "loop," illustrated in the figure shown at the upper left-hand part of page 51 of our issue of July 18, we beg to offer you the following explanation: Before the rollers are lowered, allowing the wheels of the bicycle to come in contact with the loop, the *only* momentum is the momentum in the moving parts of the bicycle and the rider. The entire wheel, the chain or gears, the cranks and pedals, as well as the legs of the rider, have momentum, which is transformed into linear motion as soon as the wheels come in contact with the loop. The frame of the bicycle and the portions of the rider's body which do not move have no momentum as long as the machine stays on the rollers. The instant, however, that the bicycle and the rider commence to move around the loop, every part of the rider and the wheel has momentum proportional to its velocity. In compassing the first quarter of the loop, the rider, by vigorously pedaling, is able to very much add to the initial velocity which is given her by the rollers. During the upper part of the loop the pressure of the wheel against the track is so slight that it is doubtful if she is able to appreciably add to the store of energy which she and her wheel had at the quarter turn. It is the centrifugal force which holds the rider and her wheel against the track in opposition to the force of gravity. The centrifugal force is equal to $\frac{W v^2}{g r}$ where W is the weight of the moving body, g the acceleration due to gravity, v the velocity in feet per second, and r the radius in feet of the circle in which the center of gravity of the moving body turns. In order that the centrifugal force may be greater than the force of gravity, it is necessary that the velocity acquired divided by the radius r should be greater than 32.2. If the radius of the center of gravity of the rider and her wheel in this case is 8 feet, then the velocity at the top of the loop will have to be at least 16 feet per second. This corresponds to a velocity of about 11 miles per hour. In order that she may reach the top of the loop, however, and still have this velocity, it is necessary that she have a greater velocity at the quarter-turn point. Assuming that she is not able to do more than overcome the friction of the air and the friction of her machine, during the second quarter of the revolution, the necessary velocity at the first quarter point may be determined by the following rule:

$$v^2 = v_0^2 - 2g(h - h_0).$$

In this case $(h - h)$ equals 8 feet, the radius of the loop. The velocity v, therefore, equals 28 feet per second, which is equal to a velocity of approximately 19 miles an hour. If she has less velocity than this at the first quarter-turn, she will be unable to make an indefinite number of turns. The same would be true of a rider who acquired the initial velocity by riding down an incline. From the formula given above for the centrifugal force, you will see that the force tending to hold the wheel against the track is inversely proportional to the radius of the loop; hence you will see the advantage of having the loop small. The weight of the wheel and rider is absolutely immaterial, excepting so far as they influence the time that is needed to acquire the necessary initial velocity.

NEW BOOKS, ETC.

CHEMISTRY OF DYE-STUFFS. By Dr. Georg von Georgievics. Translated by Charles Salter. London: Scott, Greenwood & Co. New York: D. Van Nostrand Company. 1903. 8vo. Pp. 402. Price $4.50.

The aim in view was to provide a text book presenting to the student in as lucid and condensed a form as possible the extremely wide domain of the modern chemistry of dye-stuffs. In order to present to the student an accurate picture of the modern aspect of this branch of chemistry an endeavor has been made to clearly define the true importance attaching to the several dye-stuffs whether theoretically, practically, or historically. The practical application of the dyes is relegated to a companion volume.

TELEPHONY. Vols. I. and II. By Arthur Vaughan Abbott, C.E. In six volumes. New York. 1903. Vol. I., The location of Central Offices. Pp. 170. 33 illustrations. Vol. II., The Construction of Underground Conduits. Pp. 190, 62 illustrations. Price $1.50 each.

The telephone engineer is now an important factor in the electrical field. The rules for the location of "central" are very precise, and upon this may depend vast sums. The treatment of conduits is just as thorough. The draft of contract is admirable and certainly leaves little loophole for misunderstanding. This feature is worth many times the value of the book. We shall look with interest for the successive volumes.

CONTINUOUS CURRENT DYNAMOS AND MOTORS AND THEIR CONTROL. By W. R. Kelsey, B.S. London: The Technical Publishing Company. New York: D. Van Nostrand Company. 1903. 12mo. Pp. 440. Price $2.50.

Perhaps the features which differentiate this volume from similar works is the rather fuller treatment of electrical traction, so far as tramway-motors and their gear are concerned, and in the discussion of the flux-speed-torque. The work is illustrated by 225 engravings and diagrams. Its treatment is lucid and we can commend it to young electricians who have some knowledge of mathematics.

A SYSTEM OF PHONOSCRIPT AND PHONOTYPY. By Charles Morrell. 4th edition. Chicago: Phonic Institute. 16mo. Pp. 108. Price 25 cents.

LAVORI MARITTIMI ED IMPIANTI PORTUALI. Per Bastiani Flavio. Manuali Hoepli. Milan: Ulrico Hoepli. 1903. 18mo. Pp. 424. Price $1.50.

An admirable work dealing with all kinds of harbor work, docks, lighthouses, warehouses, dry docks, etc. There are now 800 of the remarkable *Manualt Hoepli.*

ELECTRICAL PRACTICE IN COLLIERIES. By Daniel Burns, M.I.M.E. London: Charles Griffin & Co. Philadelphia: J. B. Lippincott Company. 1903. 12mo. Pp. 224. 142 illustrations.

It is interesting to know that so much interest is being exhibited in the use of electricity in collieries, and in mines generally. Electricity lends itself readily to mine work, both for light and power. The book is an excellent one, even though we notice that it may serve as a guide to students who may be preparing for a certificate as mine managers.

RURAL SCHOOL AGRICULTURE. Exercises in Agriculture and Housekeeping for Rural Schools. By Willet M. Hays. St. Paul, Minn. n. d. 16mo. Pp. 199. Price 60 cents.

This book is worthy of wide circulation, and is badly needed. There are 237 exercises, all of a useful nature. The first exercise deals with the size of strawberry boxes, sharpening pocket knives, temperature of well water, pruning soft maples, and a host of other useful things follow. It interests even the casual reader.

THE ALTERNATING CURRENT TRANSFORMER. By F. G. Baum. New York: McGraw Publishing Company. 1903. 12mo. Pp. 195. Price $1.50.

A very important subject which has been somewhat neglected, except by the electrical press. It is hoped that the present work will be of use to engineers and the general student of electrical literature. Some knowledge of elementary alternating currents is presupposed.

INDEX OF INVENTIONS

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

September 22, 1903,

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

Adjustable holder, W. A. Dickinson	739,482
Air brake mechanism, J. Shourek	739,793
Air brake mechanism, T. J. Quirk, reissue	12,158
Air compressing apparatus, F. E. Bachman	739,472
Air compressor, L. M. Sartain	739,792
Album, toilet box, and writing desk, combined photograph, R. Aisenman	739,571
Animal leg brace, N. P. Allen	739,634
Automobile speed indicator, J. W. Sutton	739,740
Ax handle protector, J. C. Dalrymple	739,652
Axle box for vehicle wheels, T. Hill	739,415

(Continued on page 255)