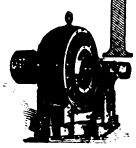
Frederick A. La Roche and His Electrical Work.



IN the United States, as perhaps in no other country of the globe, energetic and intelligent effort to achieve legitimate business success or scientific prominence receives generous recognition and encouragement. Having to contend with little or no class distinction, the young American makes his start handicapped only by the conviction that there are, as there always will be, many hands reaching out for that rung "at the top of the ladder," where, someone has told him, there is still an abundance of "room." But although the top of the ladder, seen from its lowest rung, seems almost to vanish as it extends upward and many of the "rungs" appear already to be too heavily laden to bear additional weight, still the aspirant for success has consolation in the fact that but few of those at the upper end reached there without climbing rung by rung the same rickety ladder.

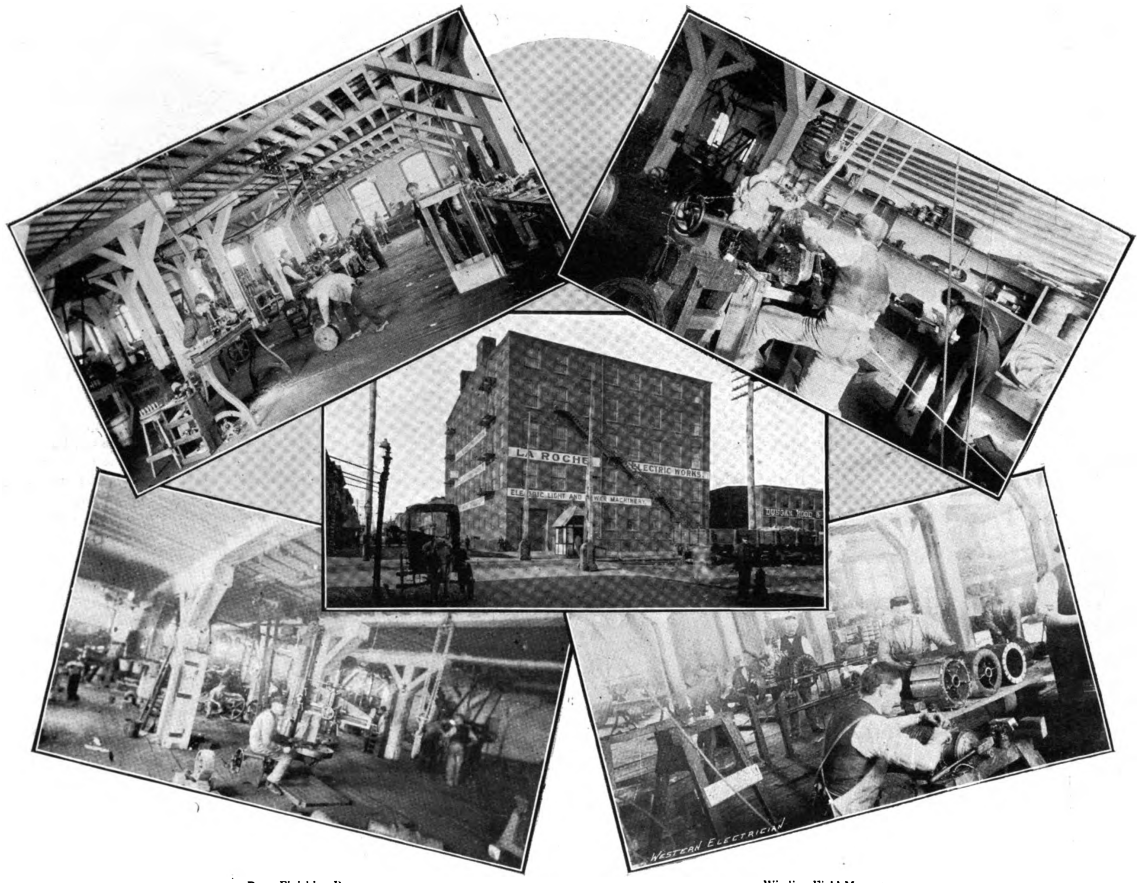
Mankind the world over stands ready to applaud a victor. In this country, where almost every man has to struggle for himself, the story of life's fight—perhaps successful, perhaps otherwise—be it of the millionaire philanthropist or the aspirant for the honors of the prize-ring, commands and holds the attention of the public. This is as true in commercial affairs as in any other department of human endeavor. The man, however, who carries on an old established business must need look to his grandfather or predecessor for the tale of the early struggles, and even then he but faintly grasps the full meaning of the word "pioneer." But how many who read the columns of the WESTERN ELECTRICIAN could tell a story of their own pioneering and work to the present time? How interesting such tales would be, and particularly so if all the happenings in "inner circles" during the last two years were recounted. In the running a few have fallen, some have recovered and again joined in the race, and others have kept steadily on until to-day a number of those concerns, starting several years ago in a modest way and laboring under many obstacles and difficulties, now find themselves in the foremost rank. It is the history of an enterprise entitled to rank in the class last named that commands our interest.

Fourteen years ago Frederick A. La Roche began in a small way the manufacture of laboratory instruments and dynamo-electric machinery, and to-day he holds the presidency of the La Roche Electric Works of Philadelphia, an establishment whose magnitude can better be appreciated after reference to the accompanying illustrations. The very fact of the humble start years ago lends additional interest to the recital of his electrical work. The facts of Mr. La Roche's early electrical experiences, as obtained from himself, are substantially as follows:

Frederick A. La Roche was born on October 4, 1859. At an early age he began to exhibit an aptness for mechanics that found vent in the manufacture of small steam engines, mechanical toys, etc. At the age of fourteen Mr. La Roche commenced a course of chemistry with Prof. Mathew of New York. Three years later he removed to Philadelphia and finished a course of civil and electrical engineering under Prof. Beck. A recital of many of his boyish ideas and experiments would afford considerable amusement, but through them all could be seen the talent and energy that finally enabled him to triumph. One project in particular on which his useful dreams of fortune were wrecked centered in an attempt to build a motor with permanent magnets wherein he used the current of several primary batteries to temporarily invert the poles of the magnets by sending around them a current opposed to their natural polarity. The experiment was a failure from an electrical point of view; nevertheless, from each failure young La Roche gleaned some valuable information that was stored in his brain for future use. Another example that met with a similar fate was an effort to combine storage and gas batteries in the same cell. The youthful experimenter made an iron vessel with a tight fitting lid, and provided the interior of the cell with the elements and compartments for the gases evolved during charging. This battery really gave three volts before it exploded, and this was the consoling thought that repaid him for the effort.

But the more serious work of Mr. La Roche's life commenced when, in 1880, he began in a small way the manufacture of laboratory instruments and dynamo machinery. These were his specialties, although "everything was grist that came to the mill." A good measure of success attended this venture and Mr. La Roche's work gave him such prominence that he was unanimously chosen as manager by the directors of the Electric Lighting company of Germantown, Pa. This plant was in so demoralized a condition that it had ceased to operate. With character istic energy the new manager set about conquering the difficulties, and after much labor and painstaking care, he had the satisfaction of making the plant a first-class electrical and financial success. In an emergency Mr. La Roche showed that he had the useful faculty of doing the proper thing at the right time; he seemed almost intuitively to discern the cause of any trouble and to be ready with an expedient for its remedy.

Many interesting reminiscences might here be recorded of the experiences of Mr. La Roche while with this company, but it is sufficient to say that after two years in charge his progressive spirit, no longer content with the restricted field, urged him to launch out on a greater scale. Therefore, in 1887, he with several others associated themselves in a co-partnership for the manufacture of large dynamos and motors. This partnership was very short-lived, however, and it was dissolved in August of the same year. Thereupon Mr. La Roche immediately and upon his own responsibility founded the present well-known La Roche Electric Works of Philadelphia. The



Brass Finishing Room. Machine and Blacksmith Shop. Exterior View. Winding Field Magnets. Armature Room.

FIG. 2. FREDERICK A. LA ROCHE AND HIS ELECTRICAL WORK.—VIEWS OF THE FACTORY.

first year or two witnessed a weary, disheartening struggle, but the cheerful, energetic spirit at the head of the enterprise knew no defeat, and to-day Mr. La Roche stands at the head of one of the most flourishing concerns in the country.

As an inventor Mr. La Roche has long been noted, and many are the useful contributions he has made in the line of electrical development. Some interesting examples may be cited. On one occassion his peculiar originality brought him into a controversy with the Patent Office. He had devised a new system for the distribution of electric current wherein he placed a dynamo at each end of the circuit, their like poles connected with a view of performing all work between the generators. The application for a patent on this discovery at first met with a positive refusal on the grounds that the invention was without merit and because it was directly opposed to well established laws of electrical science. This decision was finally reversed, when, after a practical illustration, Mr. La Roche not only proved the practicability of his invention but demonstrated that this method furnished an economical, equable distribution of current and that the potential remained the same throughout the circuit. This system has been successfully employed for a number of years for incandescent lighting. Mr. La Roche was the first to suggest two filaments in the same lamp, one of high and the other of low resistance, the object being to secure a dim as well as a bright light by simply turning the key and switching the current from one filament to the other. A similar end he accomplished also by secreting a resistance bobbin within the socket of a lamp, so that the light could be regulated with the same facility as gas. Carbon brushes for dynamos and motors formed the basis of early experiment with him, and such good results were obtained that he devised and patented a peculiar holder for the carbons. With this combination sparking at the brushes and wear of the commutator were practically eliminated.

Mr. La Roche has for several years given special attention to alternating current machinery. The very excellent alternating system of this company is the result of his labor as well as some five or six other systems that are now owned and operated by this company. The resolute, determined manner with which he attacks the solution of a problem generally insures its satisfactory determination. Nothing seems to daunt him, from the requirements of the most delicate, accurate instrument work to the building of a 10,000 light dynamo, and he supervises the manufacture of everything between these extremes. As manager of an electrical manufacturing company Mr. La Roche's talents are conspicuously exemplified. Of late years Mr. La Roche's business has grown rapidly and his apparatus to-day is considered as standard throughout the country, being used in a great many colleges, laboratories and scientific schools. The founder of the company has surrounded himself with a capable staff of assistants, whose portraits are shown about the likeness of Mr. La Roche in Fig. 1.

J Frank Stevens, the secretary and treasurer of the company, was elected to the position he now holds by the directors last November. Mr. Stevens is a graduate of the University of Pennsylvania, having taken a degree in mechanical and electrical engineering. He was formerly a member of the firm of John S. Stevens & Sons, where he obtained his practical and financial training. His services are extremely valuable to the company, which feels that it has made a wise selection.

George S. Loutey is the superintendent of construction and installation. He has been employed by the company about eight years, and is greatly esteemed by the officers for his faithfulness and loyalty.

William G. Toplis, the chemist, has been associated with Mr. La Roche for twelve years. It is unnecessary to say much regarding his reputation as a first class chemist; the fact has long been recognized. Mr. Toplis has contributed a number of inventions to the government.

J. W. W. Conman, a graduate of the Manual Training School, has charge of the instrument department. He is well known in the instrument business, having been in the employment of Queen & Co. There is no doubt that the instrument department will be greatly benefited by this valuable acquisition.

George W. Bacon and Frank R. Ford are members of the engineering staff. The former is a graduate of Cornell University, having taken degrees in mechanical and electrical engineering, and was formerly with the Wightman Motor company of Scranton, Pa. Mr. Ford graduated from the University of Pennsylvania, and was formerly with the Short Electric company of Cleveland, O., having charge of the Chicago office. He now has charge of the railway department of the La Roche Electric Works.

Gurney F. Coleman, who has had an extensive experience in the installation of isolated and central station plants, is now associated with the La Roche company in that capacity. His extensive experience has made him well fitted for the position. Mr. Coleman is also a graduate of the University of Pennsylvania.

C. J. Miller, assistant superintendent of the works, was formerly with the Novelty Electric company. He attends to the details of the manufacture of the apparatus under the direction of Mr. La Roche.

The La Roche Electric Works were started in a room eight feet square with a small foot lathe and one mechanic (Mr. La Roche himself). Business prospered, and an addition was made in the shape of a boy, and business still increasing a "one-half" mechanic was engaged and afterward another boy. The demand for small dynamos being considerable, the whole of the second floor was then taken and about one year afterward the third floor of the same building. Still finding it necessary to have more room, the building at 116 North Sixth street was rented and three floors used, and a short time after that the entire building was used. The business still continued to grow; new machinery was purchased from time to time and more men put on Finally the building became too small for the work, and the building at No. 118 was then rented and doors cut through, and the company continued there for nearly three years. Such was the demand for the La Roche apparatus, especially for large machines, that Mr. La Roche incorporated the business into a stock company, which subsequently purchased the property now occupied at American and Diamond streets. The factory is fully equipped with all modern machinery, apparatus etc., so that any machine up to 5,000 lights or 500 horse power can be handled. The building faces three streets —American, Diamond and Bodine—and on the north side there is considerable ground to enlarge if necessary. It is seven stories high with a frontage on Diamond street of 120 feet and on Bodine street of 116 feet. It is substantially built with 30-inch walls, thoroughly braced floors, etc. A series of exterior and interior views is shown in Figs. 2, 3 and 4.

The power plant comprises three 125 horse power engines and one 25 horse power engine. One of the larger engines drives two direct current generators, one alternator and an arc light machine. The direct current generators furnish power throughout the establishment, as all the departments are run with individual motors, no belts of any kind passing through the floors. Where there are grouped a number of machine tools a small countershaft is placed above driven by an electric motor. The small 25 horse power engine is used for lighting the office, etc., after 6 P. M., when the main plant is shut down, provided the factory is not in operation. The two remaining engines are employed for testing the apparatus and are so arranged that any one, or the combined power of three, can be concentrated upon one generator. There are in all four boilers of 125 horse power each, of which one is used for heating the building and the remaining three for power purposes.

1. F. A. La Roche.
2. J. Frank Stevens.
3. George S. Loutey.
4. William G. Toplis.
5. J. W. W. Conman.
6. George W. Bacon.
7. Frank R. Ford.
8. Gurney F. Coleman.
9. C. J. Miller.

FIG. 1. FREDERICK A LA ROCHE AND HIS ELECTRICAL WORK —EXECUTIVE STAFF OF THE LA ROCHE ELECTRIC WORKS.

On the ground floor is also located the blacksmith shop, where all the heavy machine work is done. There is also considerable heavy brass work done on this floor, as some of the brass spiders and shields used in the 5,000 light alternators are turned up and finished in this department, as extra large lathes and tools are required to handle these large diameters. This department is well equipped with new, large and modern machinery. On the same floor, one of the planers, as shown in Fig. 3, is run by individual motors.

The erecting, assembling and testing room, where there are a number of large and small direct current machines and alternators in the course of construction, is on the second floor. The stock room is also located on this floor. In this room is a large stamping press, where the armature disks are cut and stamped, insulated and assembled. The alternator armatures are of novel and ingenious construction and are so arranged that any num-

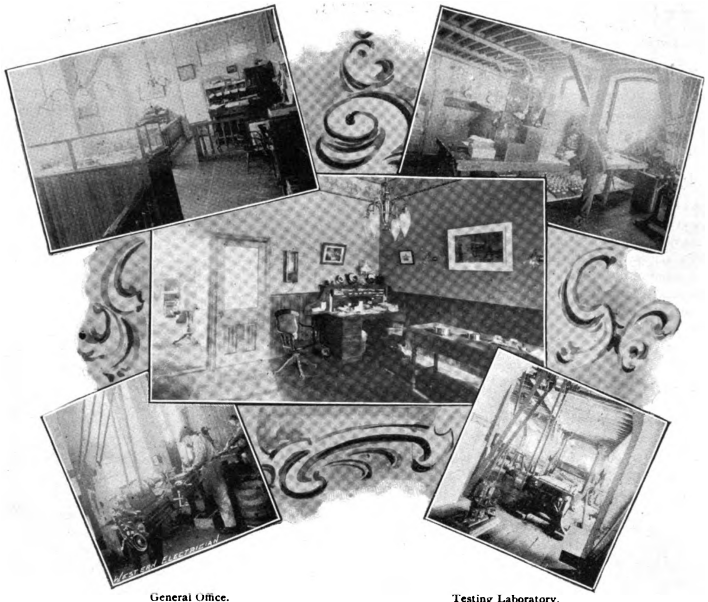
ber of coils up to one-half the total number may be burnt out or affected by any other cause without interfering with the machine running at full load, and in case of such an accident repairs can be made in a very short time. A toothed armature is used for all alternators of 500 lights capacity or over and a smooth armature for all under that size. The armatures are of the laminated type, made of the best Norway iron, insulated with specially prepared paper. On the 2,600 light machine the armature is bolted together with 27 bolts. The armature grooves are of a new design and exceedingly shallow, insulated with asbestos and the best grade of mica, making them practically fire and water proof. There are no complications of any kind about the entire apparatus; it is exceedingly simple, and can be run and handled with impunity. The armature is mounted upon an extra heavy steel shaft ground to gauge. It is absolutely iron-clad and no wire is shown when completed. It will be noticed that in this machine the frame or ring is cast in two separate parts so arranged that the top half can be removed and any field coil placed or replaced. Another advantage claimed by the manufacturers is that it is not necessary to remove the armature or any portion of the machine to insert a new coil, as that can be done without removing any part or parts. The end of the armature is protected by a brass shield, which is carefully insulated, and where leading-in wires are cut through it is insulated with micanite and hard rubber bushings. The collector rings are mounted upon an individual sleeve and arranged so that either one or both rings can be removed in a short time. All machines are equipped with ball and socket self-oiling bearings. Although the company has been more recently occupied with alternating machinery, it nevertheless continues to manufacture direct current apparatus. It is now making power generators ranging in size from 50 to 300 horse power. All generators of 100 horse power and under are built on the motor bipolar type. The generators over 100 horse power are made on the multipolar type with circular fields similar to the alternating machines. The direct current machine is one of the most automatic on the market, the method of regulation being new and different from the ordinary method. All direct current machines have Gramme ring armatures, and the company from the beginning designed its machines with armatures having the greatest dimension in their diameters. It is evident that this construction permits of a machine of the same output being run at much less speed than when the armature is reduced in diameter and increased in length, a practice quite generally followed. It may be stated here that the La Roche company was among the first in this country making alternating apparatus.

On the third floor is the brass finishing room, which is well equipped with modern machinery. On this floor also is the armature and field winding department, where armatures and fields of both direct and alternating apparatus are separately wound on frames or spools and slipped on machines when completed. A stock of coils is kept constantly on hand. In this room there are a number of smooth and toothed armatures in course of construction. In the usual method of winding both fields and armatures, the winding is begun at one end of the wire and carried out continuously, the other end being finally made to cross the convolutions in order to be brought out parallel with the other end; this subjects the crossing end to the maximum difference of potential on the entire coil and is a frequent cause of burn-outs and short-circuits due to the inevitable vibration which takes place and consequently damage to insulation. In the method pursued by Mr. La Roche the winding is begun in the middle of the wire, both ends being wound at the same time, and when the wire is finished the two ends come out opposite each other at the center of the coil without crossing any convolution whatever. This method brings the least insulation strain on the wire, and the breaking or burning of one end does not require the entire rewinding of the coil.

Recognizing the value of accurate and reliable indicating instruments in isolated as well as central station work, the La Roche company almost from the beginning has built the indicating instruments with which its plants have been equipped. These instruments consist of a voltmeter, potential indicator, ammeter indicator and ampere meter. These instruments are handsomely gotten up, enclosed in a brass case having either back or surface connections and make a very neat appearance on the switchboard.

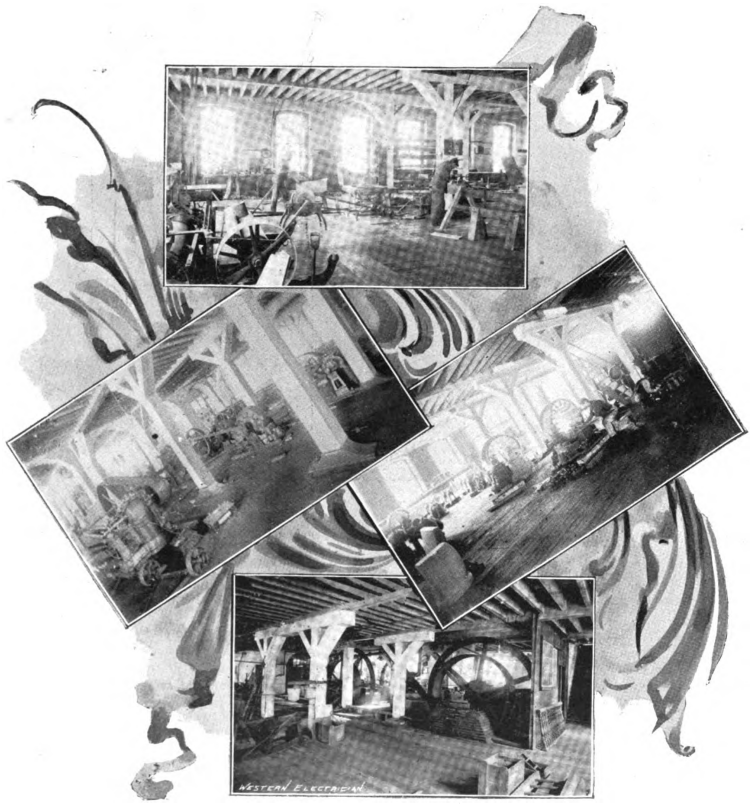
The fifth floor is used for a wood-working, pattern making and packing room, while the sixth floor is utilized for storage purposes. All the floors are connected by an elevator operated by means of an electric motor.

Mr. LaRoche claims to be the first man to make a successful automatic, cut-off, constant current motor. When Prof. Maxim came to this country and started to manufacture in Philadelphia what was known as a Maxim machine, Mr. LaRoche, who was quite young at that time, brought a motor to the professor asking him to test it on a circuit. The professor answered that no motor could be made that would stand the pressure. He finally put it on the circuit, but it heated to a considerable extent, although after rewinding it was found to work nicely. From that time on Mr. LaRoche made a specialty of building both constant current and constant potential motors and up to the present time there are quite a number of LaRoche constant current motors on the Brush circuit in Philadelphia. The La Roche company has been running its works



General Office. Mr. La Roche's Office. Testing Laboratory.
Lathe Driven by Motor. Planer Driven by Motor.

FIG. 3. FREDERICK A LA ROCHE AND HIS ELECTRICAL WORK.—OFFICE AND FACTORY GLIMPSES.



General Testing Room. Pattern and Carpenter Shop. Engine Room. Assembling Room.

FIG. 4. FREDERICK A. LA ROCHE AND HIS ELECTRICAL WORK.—FOUR IMPORTANT DEPARTMENTS.

for the past six months, day and night, working on large alternating machines. It has recently installed several 2,600 light machines, and quite a number of 1,300 light alternators, two of them for the Quincy Electric Light & Power company, Quincy, Mass. The company operates under patents granted to F. A. La Roche, and which are owned by the company. It is making a special line of alternating current machinery, also direct current machinery for incandescent lighting, power generators, railway motors, arc lighting aparatus; in fact electrical machinery of every description. The company is also about to put on the market a special line of direct-connected apparatus, which if it comes up to the high standard which has been established, cannot fail to be a success. It is also making a complete line of switchboard apparatus. The company is represented in the large cities of the country as follows: Chicago, Hood & Osburn, 239 La Salle street; New York, W. A. Vail, 136 Liberty street; St. Louis, Owen Ford, Rialto building; Boston, Campbell Electrical Supply company, 104 High street; San Francisco, San Francisco Electric company; Knoxville, Tenn., Southern Brass & Iron company.

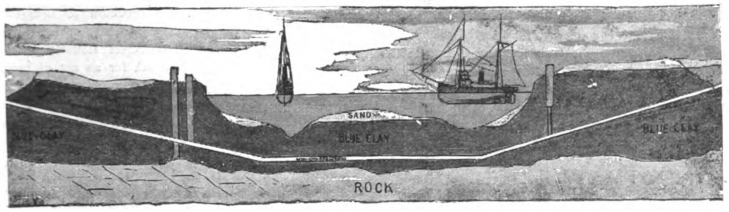
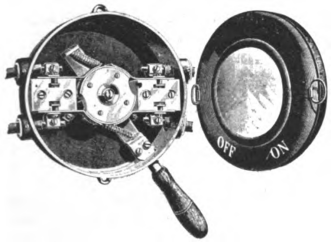


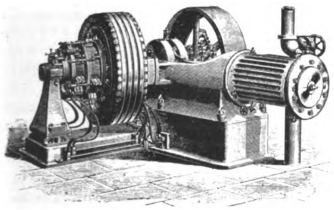
FIG. 2. KERITE UNDER LAKE HURON.



BRYANT-CLEVELAND ARC LIGHT CUT-OUT.

Bryant-Cleveland Arc Light Cut-out.

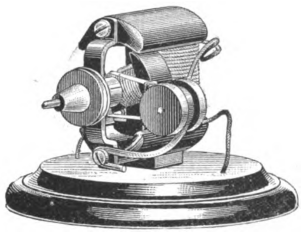
The accompanying cut shows a new arc light cut-out. The Bryant Electric company, Bridgeport, Conn., which purchased the patents of the Cleveland arc light cut-out has developed, and modified its construction, and is placing this new cut-out on the market. The cut-out is made of metal, porcelain and glass. The connections are of the K. W. pattern. The action of the cut-out is quick and positive, and the position of the handle indicates whether the current is off or on. The cap is of light metal with a glass permitting the mechanism of the cut-out to be always in full view. It can also be easily removed so as to give free access to the interior of the switch. The western office of the company is located at 1522 Monadnock building, Chicago.



BALL DIRECTLY CONNECTED ENGINE.

Ball Directly Connected Engine.

The direct connection of engine and dynamo has a two-fold advantage: The first of these is the small floor space occupied. Another advantage is in the elimination of wastes of energy by transmission through belts and counter-shafting. The accompanying illustration represents an 80 horse power Ball engine, made by the Ball Engine company, Erie, Pa., directly connected to a Waddell-Entz dynamo. It shows the armature mounted on the engine crank shaft, which is supported on the end by an outboard bearing resting on an extended sub-base. This is a remarkably compact, durable and efficient arrangement, and has given the greatest satisfaction in practice. The distinctive features of this engine are: Carefulness of design, simplicity and compactness, solidity and strength of frame, large bearings and wearing surfaces, excellence of materials and workmanship. The engine is economical and durable, and being so perfectly balanced, will run quietly and smoothly under the heaviest and widest varying loads. Every detail of construction receives the most careful inspection, and every engine is thoroughly tested before shipment is made.



SMALL MOTOR OUTFIT.

New Bergmann Alternating Arc Lamp.

One of the distinctive features of the electric lighting industry during the last year has been the marked increase of interest in the subject of arc lighting on alternating current circuits by means of the so called incandescent arc lamp. The new Bergmann alternating current lamp now being put on the market by the General Incandescent Arc Light company of New York is a lamp of this character. As in the case of its direct current lamp, this company manufactures its alternating current incandescent arc lamps in various styles and degrees of ornamentation, from the plainest standard lamp, which is itself sightly in appearance and neat in design, to the most elaborate patterns. In the accompanying cut is shown a representative type. Some of the claims which are made for these lamps are simplicity of mechanism, first-class workmanship, absolute steadiness without adjustments, ease of trimming, protection from dust and weather, starting at less than the normal current, requiring on waste of current in resistance, large range of candle power, improved carbon-holders, etc.

The company is prepared to send the lamp on trial to any responsible intending purchaser, and anticipates a rush of orders after the convention as a result of the exhibition it intends to make there. The company will be represented at the convention by its general sales agent, S. A. Douglas, who will be pleased to go into the details and show all the excellent qualities and points of merit of this incandescent arc lamp to those who will be present at this meeting of the various electric light interests.

NEW BERGMANN ALTERNATING ARC LAMP.

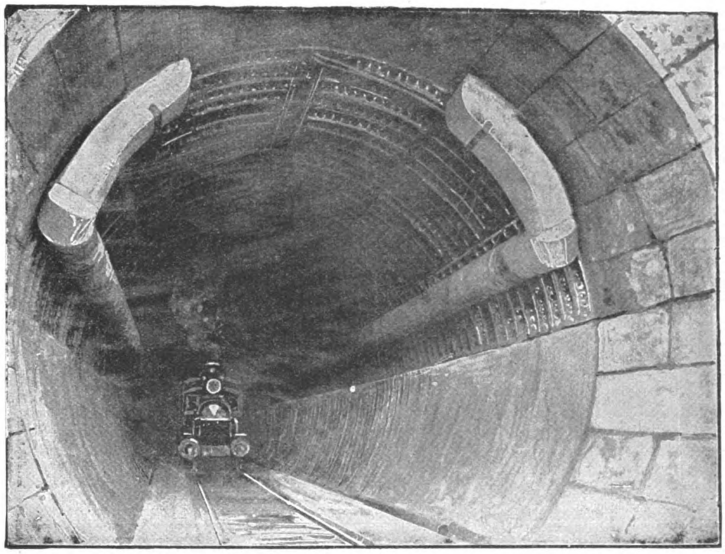


FIG. 1. KERITE UNDER LAKE HURON.

Kerite Under Lake Huron.

Engineers watched with considerable interest the construction of the great St. Clair tunnel, which was built under the foot of Lake Huron, between Sarnia, Ont., and Port Huron, Mich., and by means of which the water passage across the Straits of St. Clair at the lower end of Lake Huron is avoided, and a continuous journey by rail