

THE BAXTER ELECTRIC MOTOR.

Early electricians had only a slight conception of the possibilities of electrical science. The discovery of the galvanic current, the invention of the voltaic battery, and many other comparatively early electrical discoveries and inventions were vitally related to the later development of the science, and were, as they are still, of great utility; but it was not until Faraday made his brilliant discovery of magneto-electric induction that electrical science gained any marked impetus. From Faraday's time to the present, progress has been made in an almost geometrical ratio, and it may be truthfully said that no branch of science has been developed with such rapidity and thoroughness as that of electricity.

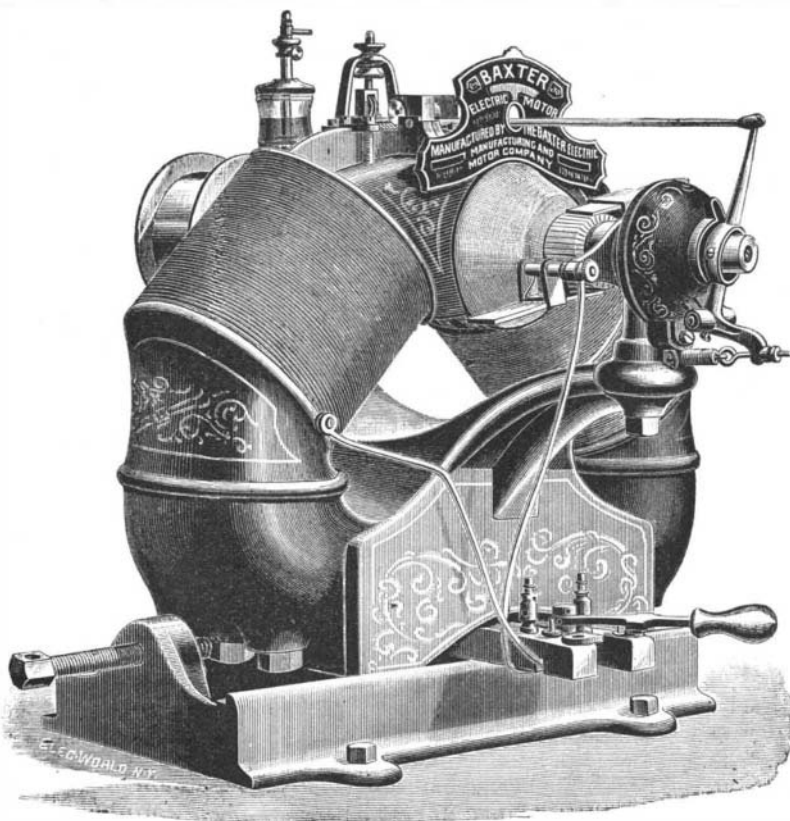
The most important result of the discovery of magneto-electric induction is the invention of the dynamo-electric machine, by means of which steam or water power is converted into electrical energy. Following this are the inventions which provide ways for distributing electrical energy so that it may be utilized anywhere within the radius of from one to twenty miles from a dynamo or generator, for electrical illumination or for power in very large or very small quantities.

It is well known to those at all conversant with the subject that there is no essential difference between a dynamo and a motor. Any machine which is efficient as a generator of the current will also serve to convert electrical energy into mechanical energy. Certain refinements of the machine, however, are necessary to secure the best results in the utilization of the current. For instance, it is important to provide a machine which will absorb only so much of the current as is needed for a particular use. It is also essential to construct a motor so that it will maintain a practically uniform speed under all loads. It is also necessary, especially when the motor is used in a circuit of high voltage, to arrange it so that in starting the current will be gradually applied to the armature.

The Baxter electric motor, which we illustrate, is constructed with a view to carrying out these principles in the simplest and most practical way. The manufacturers of this motor have succeeded in producing a type of machine for any power from $\frac{1}{2}$ horse power to 20 horse power, adapted to work on constant current, and from $\frac{1}{4}$ horse power to 150 horse power on constant potential circuits, the machines being constructed differently, to adapt them to different con-

ditions. They are known as "constant current" or "constant potential" motors as the case may be. These motors have been applied to work which has heretofore required steam engines, gas or air engines, and have been used for running every variety of machine, from a sewing machine to a printing press, or even a whole workshop or factory. In addition to the manufacture of these motors, the Baxter Electric Manufacturing & Motor Co. are building generators of 150 horse power capacity to be used in the distribution of power, and contemplate carrying the size upward as the demand increases.

box also serves as a convenient means for turning on and shutting off the current. In the "constant current" machines, the regulation is secured by the action of a centrifugal governor carried by the end of the armature shaft. This governor



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moves a contact roller over a series of copper strips connected with the convolutions of the field magnet. The "governing" is effected by cutting out these convolutions successively when the speed increases, even imperceptibly, and a reverse action takes place when the speed tends to diminish.

The Baxter motor is at present operating over one hundred industries. In Baltimore they have been adopted so extensively that the local Brush company was obliged, some time since, to construct four special Baxter motor circuits. From these circuits the motors are supplied with currents for driving an immense number of sewing machines, ventilator fans, turning lathes, printing presses, shoe factories, and machinery of every description. In Johnstown, N. Y., the Brush company has also constructed a special power circuit to supply the Baxter motors there in use. In Troy, N. Y., every printing establishment in the city (with a single exception) employs the Baxter motor to run its printing presses. In Boston, N. Y. City, and New Orleans, the motors have been very extensively used; in fact, they are in successful use all over the United States.

As an example of the wearing qualities of the Baxter motor, we mention the fact that in one of the old shops of this company a ten horse power Baxter motor, after more than a year's continuous running, was examined, and the commutator was found but slightly worn, the machine never having been stopped for an hour during the entire period for repairs.

The business of this company has increased to such an extent as to necessitate the building of a new factory especially arranged for the manufacture of dynamos and motors. The factory consists of two large buildings located in the suburbs of the city of Baltimore, Md., one being a two-story brick workshop 260 ft. long and 60 ft. wide; the other, including engine and boiler room, furnace room, paint shop, etc., being 150 ft. long and 50 ft. wide. This factory is well equipped with modern machinery and appliances, and everything has been arranged with a view to the production of the most perfect work.

The Baxter company has offices in all the principal cities of the country, that in New York City being located in the Potter Building.

AN IMPROVEMENT IN LOCOMOTIVE BOILERS.

A device providing a live steam pipe for each engine, by which the dry steam is supplied to one of the engines in case the other is disabled, the throttle valves being detachably connected to a single operating lever, is illustrated herewith, and has been patented by Mr. Middleton G. Fuller, of Ten Mile Hill, S. C. Into the usual steam dome extend two dry pipes, each leading to the cylinder of one engine, the usual throttle valves being held in the upper ends of the pipes in the steam dome, these valves being secured to links pivotally

connected with the short arms of bell crank levers connected by their long arms with rods which pass through the usual packings in the end plate of the boiler. The outer ends of the rods are curved toward each other and are pivotally connected by bolts with the throttle valve lever, the connecting bolts being placed one above the other, so that both rods have the same leverage on the throttle valve lever. If one of the engines becomes disabled, the engineer removes the upper or lower bolt connecting a corresponding rod with one of the throttle valves, so that the movement of the throttle valve lever then acts on only one valve, while the other remains stationary. The engineer is thus enabled, in case of an accident on the road, to supply sufficient steam to one engine to serve temporary purposes and prevent delay.

Another Generous Gift for Industrial Education.

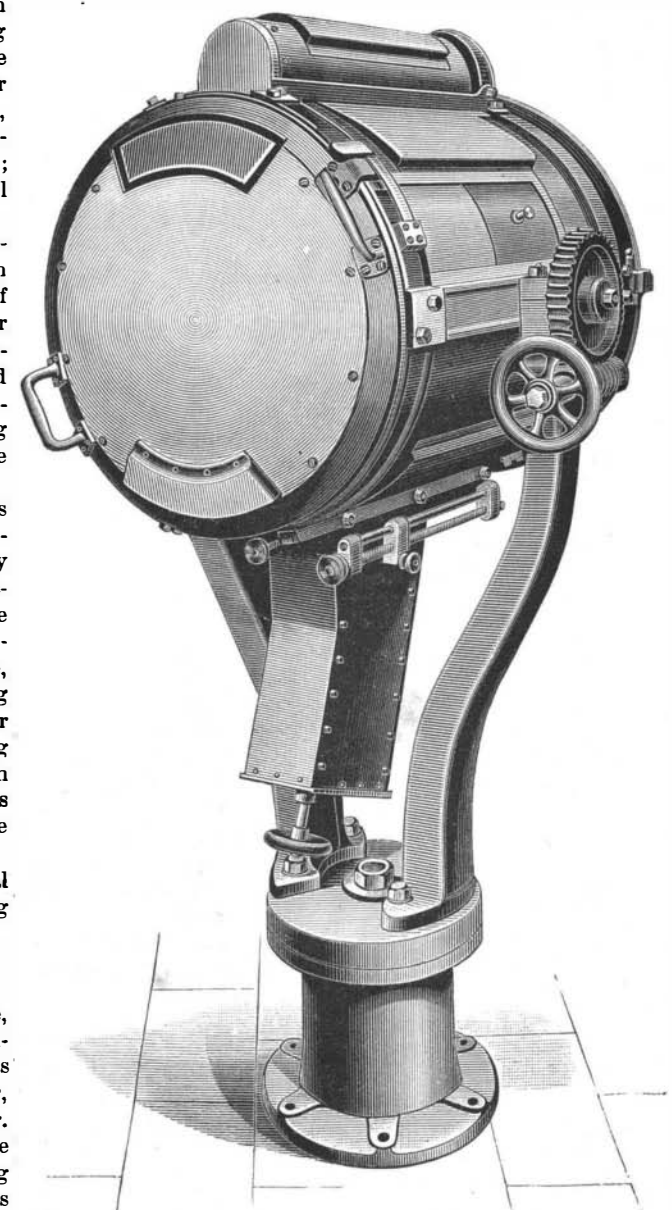
J. V. Williamson, the millionaire of Philadelphia, is about to found an institution similar in many respects to Girard College. He has determined to begin operations at once and, though feeble in health, hopes to finish during his lifetime. The cost is estimated at over \$5,000,000. It is to be an institution for the education of boys in all departments of mechanical labor. Mr. Williamson has appointed seven trustees to manage the business, whose names are carefully kept from the public for the present.

Spider Poisons.

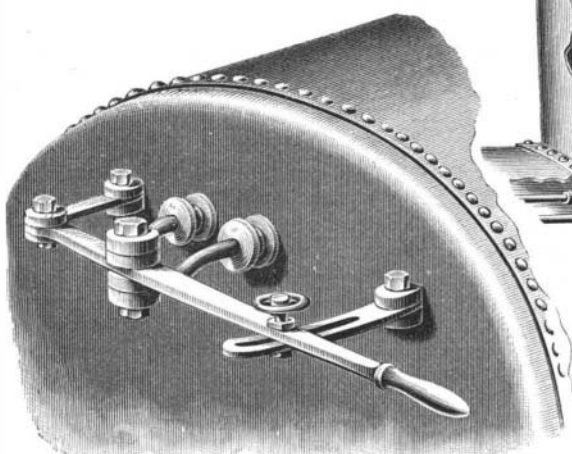
Professor Breeger has recently investigated the poisons of spiders. He found that the Russian varieties of spider, *Phalanchium* and *Trochosa* (tarantula), are non-poisonous, but that a third, *Caracurt* or "black wolf," secretes a powerful poison, forming 25 per cent of its whole weight. This substance is a peculiar, unstable alkaloid, destroyed at 60 deg. C., or by alcohol. Introduced into the circulation of warm-blooded animals, one-thirtieth of a milligramme per kilogramme of the animal treated was sufficient to cause death. It exceeds in power all known vegetable principles, and prussic acid, being comparable in toxicity with the poison of snakes.

IMPROVED PORTABLE ELECTRIC LIGHT APPARATUS.

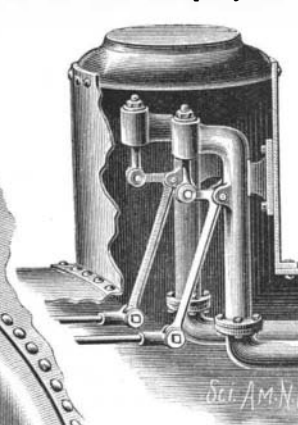
Messrs. S. Charlesworth & Co., electrical engineers, Oldham, have recently sent to the Suez Canal an improved patent portable electric light plant for the use of steamers on the canal at night. The plant consists



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FULLER'S LOCOMOTIVE BOILER.



Sci. Am. N.Y.