

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LV.—No. 9.
[NEW SERIES.]

NEW YORK, AUGUST 28, 1886.

[Price 10 Cents.
\$3.00 per Year.]

BRUSH'S COLOSSAL DYNAMO.

BY H. C. HOVEY.

The accompanying cut represents the smallest and the largest dynamos thus far manufactured by the Brush Electric Company, of Cleveland, Ohio. Before proceeding to describe the latter, it may be of interest to mention the facts concerning the original dynamo produced by this inventor.

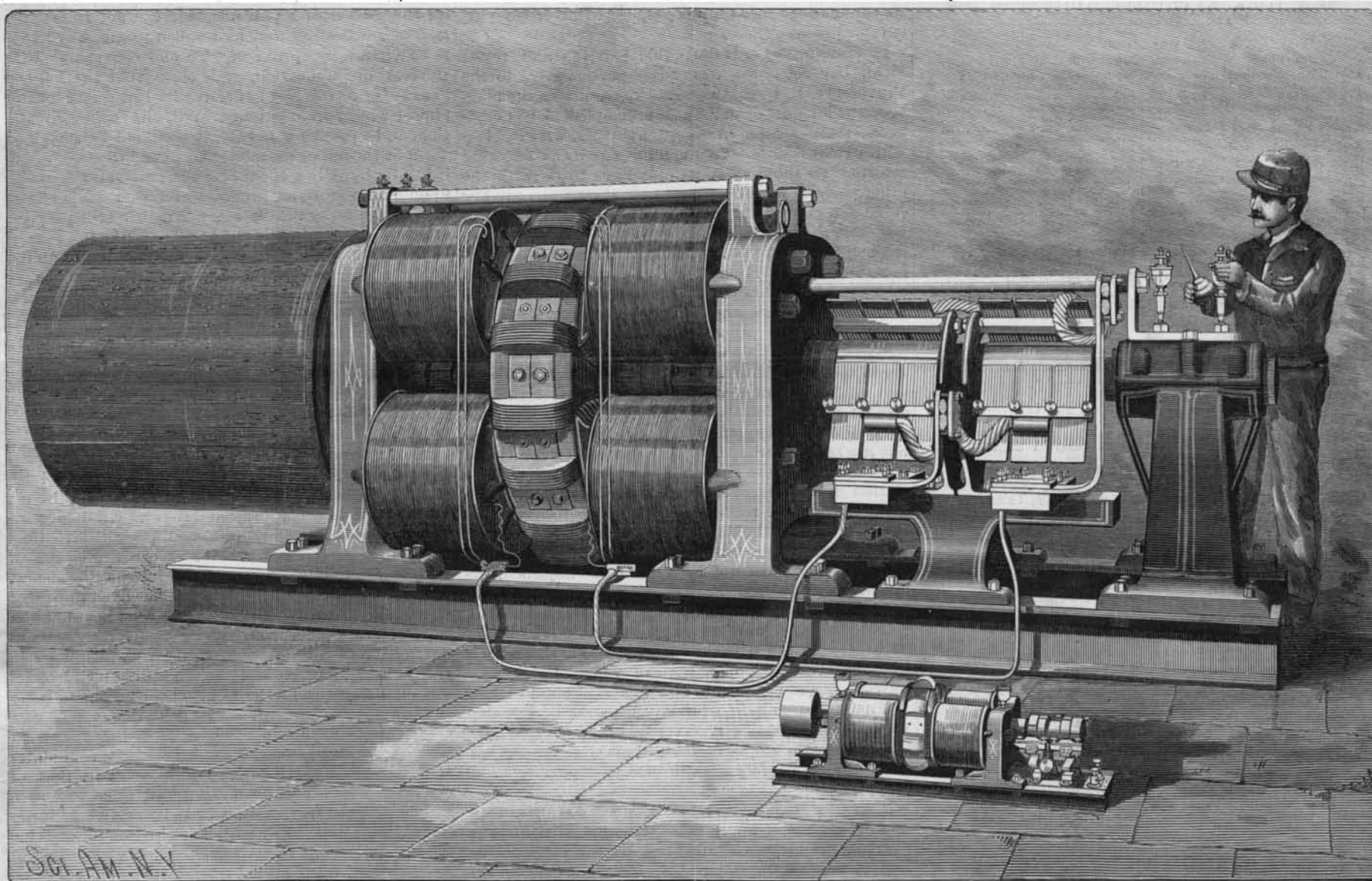
It is related that about nine years ago Mr. Charles F. Brush, then a professional chemist in the city of Cleveland, intimated to his friend, G. W. Stockley, at that time President of the Telegraph Supply Company in the same city, his purpose to make a dynamo that should excel the French and German machines. Without further ado, Mr. Brush completed his dynamo in about two months, brought it to the factory, set

to be worked out entirely *de novo*. He simply made his working drawings and placed them in the hands of Mr. Possons, the company's superintendent. The patterns, of course, had all to be made new. The machine was built exactly according to the original drawings; its parts were duly assembled; it was set in place and tested for ten days with a 500 horse power engine under all varying conditions of load, and it was found to realize all expectations, not only in the output of current, but in all mechanical and electrical details. The problem of the commutating arrangements for currents of 3,800 amperes at 100 volts would alone have been enough to discourage ordinary electricians.

The commutator of Brush's "Colossus" performed its functions perfectly on the first trial, and no difficulty whatever was experienced in this respect. In

placed at their command. Precisely what these may be, however, is as yet a matter of conjecture.

Those already familiar with the dimensions and powers of other dynamos will be specially interested in the following data, given by Mr. Brush, concerning the "Colossus": The whole machine is 14 ft. long, 5 ft. 2 in. high, 4 ft. 2 in. wide, and weighs in all 22,000 pounds. The weight of the copper wire used on the machine is 6,250 pounds. The diameter of the pulley is 40 in., and of its face 45 in. The normal speed of the dynamo is 430 revolutions per minute. The electrical capacity is 300,000 watts, or the equivalent of 5,000 incandescence lamps of 16 candle power each. We show in the foreground of our picture the smallest sized dynamo made by the Brush Co. The appearance of the largest and smallest machines may be seen at a glance.



BRUSH'S COLOSSAL DYNAMO—THE LARGEST IN THE WORLD—FIVE HUNDRED HORSE POWER.

it to work, and found it to work successfully on the very first trial. It was purchased by other parties, and has been running constantly ever since without needing repairs. This illustrates the quietness and thoroughness with which this distinguished inventor works. A peculiarity of his method is that he wholly discards empirical experiments; but when he sees that some new machine is demanded, he proceeds to meet the demand.

In this he is greatly aided by his remarkable powers of vision. He will draw his original designs, send them to the pattern maker, and when the model is returned will, by his unassisted eye, detect any deviation to within the sixty-fifth part of an inch. He can also, it is said, subdivide an inch into hundredths, using only a common pocket ruler, and do it so accurately that on testing his work by the vernier it shall be found correct to within two one-thousandths of an inch.

Last spring Mr. Brush contracted with the Cowles Electric Smelting Company (then of Cleveland, but now removed to Lockport, N. Y.) to build and deliver a 500 horse power dynamo within three months, under forfeit. He made no model nor experimental machinery, although the mechanical design was new, as may be seen by the cut, and the electrical proportions had

order to avoid attacking this very problem, Mr. Gordon, in making his great dynamo, was obliged to make the field magnets revolve, the armature remaining stationary. Gordon's dynamo, built several years ago in England, was the bulkiest machine of the kind ever constructed, being two or three times as heavy as Brush's "Colossus." It had nearly as great electrical capacity, but did not work for any great length of time, when, as we understand, it went all to pieces on account of mechanical imperfections. The "Colossus" represents the latest advance in dynamo building, having the greatest electrical capacity of any machine ever hitherto made—having, perhaps, five times the capacity of Edison's famous "Jumbo." Indeed, the Brush Company itself, a few years ago, would have had to build a dynamo of double the size to get the same capacity. But this dynamo embodies all Mr. Brush's latest improvements, and may safely be pronounced the foremost achievement of its kind.

The work to be required of it at the Cowles Smelting Works will be the reduction of refractory ores. This company has for some time past been using a Brush dynamo of 125 horse power, and the results attained have been so remarkable as to justify the expectation of still more wonderful triumphs by the means now

Eli Whitney Blake.

This well known inventor died on August 18, 1886, at his home, No. 77 Elm Street, in New Haven. He was born on January 26, 1795, at Westborough, Mass. He graduated at Yale in 1816. His uncle, Eli Whitney, persuaded him to join him in conducting the arm factory at Whitneyville. This was the origin of the famous Whitney Arm Company. He invented the famous Blake stone crusher, which has worked a revolution in all operations where minerals are to be crushed. Its familiar intermittent sound, as it crushes stones and minerals, can be heard in all parts of the world.

Mr. Blake was not only an inventor, but he figured also in the scientific world. He was one of the founders of the Connecticut Academy of Arts and Sciences, and for several years was its president. A number of papers from his pen appeared in the *American Journal of Science* and other scientific papers. A collection of a number of his papers was collected and published by him in 1882. The work was entitled, "Original Solutions of Several Problems in Aerodynamics." In 1879, he received the degree of LL.D. from Yale College. For 65 years he was a member of Center Church, New Haven. He was a signal example of the successful inventor, his fame being derived from a single device.