XVI. *An account of an apparatus on a peculiar construction for performing electro-magnetic experiments.* *By* W. H. Pepys, *Esq. F. R. S.*

Read April 10, 1823.

This apparatus [Pl. XXII.] was made under my directions for the London Institution. It consists of two plates, each fifty feet in length, and two feet in width; the one copper, and the other zinc, making a superficial surface of four hundred feet. They are rolled or wrapped round a cylinder of wood with three strands or ropes of horse hair between each plate, to prevent contact of the metals; and to maintain these in their situation, notched sticks are occasionally introduced in the rolling. Two conductors of copper near three fourths of an inch in thickness are secured to the end of each plate, from which the power is dispensed upon immersion in the acid.

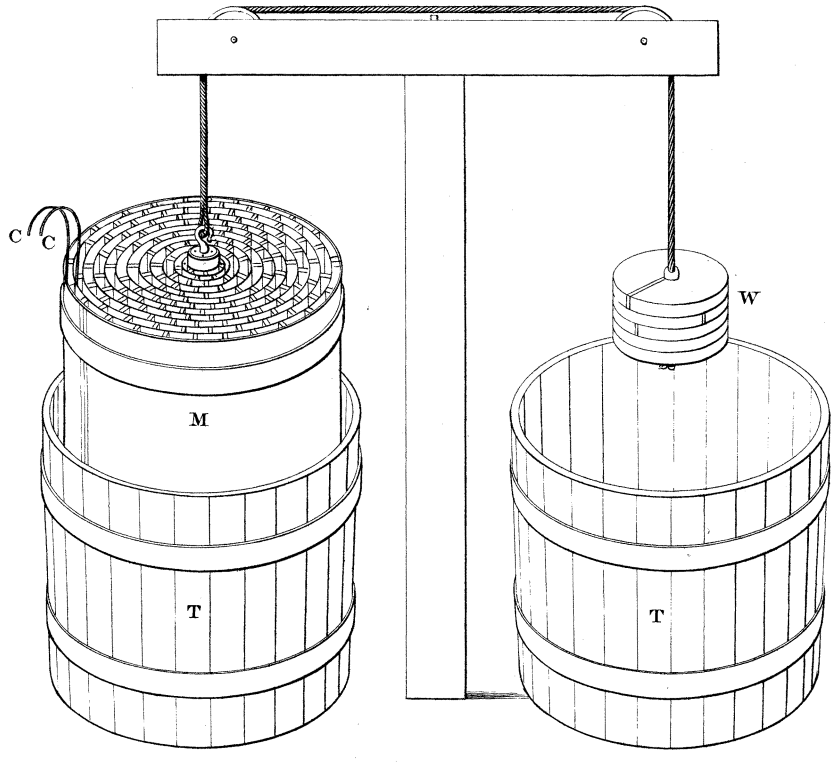
To allow of the free use of so bulky an instrument, it is suspended by ropes and pullies, with a counterpoise weight, to allow its immersion in a tub of dilute acid, or when not in use, in one of water; it requires about fifty-five gallons of fluid, and the strength of the solution used has been about one-fortieth of strong nitrous acid.

Upon immersing the instrument in the dilute acid, and uniting the two conductors, magnetic needles on *their stands* were very sensibly affected for five feet from the conductors.

Cylindrical bars of steel placed in the interior of a glass tube, surrounded by a spiral of wire, and forming part of

the circuit, were made powerfully magnetic, (so as to be suspended from each other). When the tube and spiral were placed perpendicularly, steel cylinders or bars inserted were supported entirely by the attraction; one of these cylinders weighing 272 grains; when the contact was broken, the cylinder fell from its gravity, but instantly rushed into its former place upon the contact being made. The copper *plate* conductor gave the north magnetic pole, and the zinc plate conductor gave the south magnetic pole.

This apparatus, as might be expected, has no intensity as a chemical agent, not even giving a spark with charcoal. But an extraordinary proof of its low intensity, is, that leaves or laminæ of the metals are not deflagrated, and very small portions of wire are ignited.



M. *Electromagnetic Apparatus.*

C C. *The Conductors.*

W. *The Counterpoise Weight.*

T T. *The Tubs, one for Acid, and one for Water.*