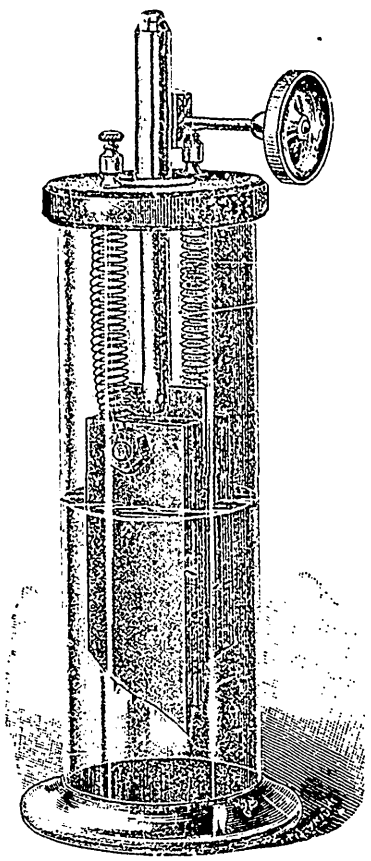
This is the unit of current strength, - thus one volt divided by one ohm equals one unit or one Ampère. Currents of this strength, *i. e.*, one Ampère, may possibly be used in electrolysis, but as this is very exceptional the true electro-therapeutic unit may be said to be one milliampère.* Thus

$$\frac{1 \text{ volt}}{1 \text{ ohm}} = 1 \text{ or } 1 \text{ Ampère.}$$

$$\frac{1 \text{ volt}}{1000 \text{ ohms}} = 1\ 1000 \text{ Ampère, } (.001) \text{ or } 1 \text{ Milliampère.}$$



The Bailey Rheostat or Current Regulator. This new rheostat supplants the commutator or switch-board. It imposes equal work upon all the cells of the battery.

2. The rheostat or instrument for regulating current strength now coming into general use is the water-rheostat. The function of the rheostat is twofold, namely, firstly, it enables the operator to increase and diminish the strength of the current gradually, and without causing any shock to the patient; and, secondly, when the rheostat and milliampère meter are both used, there is no necessity for using a commutator or current selector, and moreover, when the rheostat is used the risk of breaking the circuit abruptly is reduced to a minimum.

To illustrate my meaning, I will take an example. In one of the public institutions which I visited in New York recently, there was a battery of 60 cells placed in a closet adjoining the consulting room. From this battery of 60 cells a cable containing 61 wires was conducted to a very complicated and formidable looking switch board erected at one side of the room. On this switch board was a double commutator, so arranged that to those initiated into the mysteries of certain plugs and switches, either one cell or any number of cells up to 60 might be brought into circuit as desired. Now by the use of the rheostat and the milliampère meter all this parafernalia may be dispensed with when only two wires from the battery will be required, the one being connected with the positive, and the other with the negative pole of said battery,—the strength of the current being regulated wholly by the rheostat, that is, by interposing an artificial resistance into the circuit which may be increased or diminished at pleasure.

The new rheostat which is here exhibited was devised by a Mr. H. L. Bailey, an American electrician. Two large wedge-shaped plates of carbon are insulated from each other and made to dip into a tall glass jar containing water which half fills the jar. To each of the inferior pointed ends of carbon is attached a pyramidal shaped piece of sponge. When immersing the sponges or when withdrawing them, a very small column of water with very high resistance connects the two carbon plates through the water into which the sponges dip. When the plates are fully immersed, there is no artificial resistance or obstruction to the flow of the current, but when the plates are withdrawn from the water the resistance is so great that we may say that practically no current flows through the circuit. By this ingenious arrangement any desired resistance from a few ohms to millions of ohms may be gradually interposed or removed from the circuit atpleasure. This is a feature attained by no other instrument. The rheostats

*When this becomes generally understood, it will be correct to say of the current strength, "10 or 15 units" instead of "10 or 15 milliamperes."