produce a deflexion of only 3° when the needle is at a distance of 3 feet from the coil and its centre in the axis of the coil. Hence, by our galvanometer, in which, and in which alone, the needle may be moved to a distance from the mahogany circle or coil whilst its centre is in the axis of the coil, currents of enormous power may be measured. With this galvanometer I expect to determine,—first, the smallest number of circles, the currents of which will be fully effective, or at least as effective as any larger number of galvanic circles in decomposing water, and consequently the number which may be used with the greatest advantage in decomposition; secondly, whether Mr. Faraday's law, viz. that the quantity of the mixed gases produced by a voltaic current is proportional to the quantity of electricity which passes, holds for currents of great power; thirdly, the proportion which the surface of the decomposing plates should bear to the acting surface of zinc in each circle; fourthly, whether a battery with a given charge will work longer in producing the lime light by decomposing water than in producing the coke light, and which of the two lights is the more economical.

(To be Continued.)

Description of Apparatus for Regulating Steam Pressure. By M. GRAY.*

The great advantage to manufacturers and the employers of steam machinery—derivable from a simple means of obtaining invariable or uniform low pressure steam from a single source of variable or irregular pressure—have led me to adopt the apparatus represented in the two sketches annexed. Both arrangements are obvious modifications of the well known regulators patented and made by Mr. David Auld, who is now introducing the new forms for various manufacturing purposes, as being free from the defects of the steam piston plans, which are liable to stick, or to pass steam. In fig. 1, A B is the main steam pipe, conveying the initial high pressure steam from the boiler to the scene of operation of the lower pressure, the current being in the direction from A to B. From the side, B, a small branch pipe, c, passes downwards, and opens up, by a quick bend, into the side of an elastic diaphragm chamber, d. And to prevent the steam itself from coming in contact with the diaphragm, water is allowed to collect in this pipe, to form the actual means of communication with the chamber. This chamber is a simple cup, having a disk of vulcanized india rubber stretched across it, and held down by the

Fig. 1.

* From the London Practical Mechanics' Journal, April, 1854.

flanch of an upper bored cap, answering as a guide for a short plunger. The bottom of the plunger rests upon the elastic diaphragm, and a link passes up from it to the crank arm of a common throttle valve, forming the separation between the two parts, A B, of the main steam pipe above. The plunger is also additionally loaded by a lever, E, with an adjustable weight upon it.

To those who have given any attention to similar matters, the action of the arrangement must be pretty obvious. The steam from the side, B, of the main pipe, presses upon the under side of the elastic diaphragm, and thus closes more or less the throttle valve in the main pipe. This reduces the steam flow from the side, A; and by shifting the weight back or forward on the lever, E, the attendant can at once obtain any pressure less than that in the boiler, as he may require it. The further the weight is set towards the end of the lever, the less will the throttle valve be closed, and consequently the higher will be the pressure of the steam flowing off at B.

Fig. 2 is a similar sectional view of another modification, wherein an equilibrium valve is used instead of a common throttle valve. The two sections or chambers, A B, form part of the line of main pipe.

Fig. 2.

From the section, A, a wide pipe, c, opens into the chest of the balance valve, D, which is worked from below, and opens into the section, B. A second and narrow pipe, e, also opens from the side, A, in an elastic diaphragm chamber, F, fitted with a plunger, as in the former arrangement. The spindle of this plunger carries a series of adjustable weights, and it extends upwards and enters the balance valve chamber by a bottom stuffing box, the entered end of the spindle being attached to the sliding cup of the valve. The high pressure steam enters the section, B, of the main pipe, and passes through the balance valve to the branch, c, and thence to the section, A, from which it finds its way to its place of

use. The branch pipe, E, from the reduced pressure side, as in the former example, affords the necessary means of regulation, adjustable by means of the movable weights on the plunger spindle.

This system of regulation has been some time in successful operation at the cotton mill of Messrs. James Black & Co., Peel Street, Mile-End, Glasgow.

Glasgow, March, 1854.