angular rotation becomes less as the backing off current is increased. Suitable constructions of the formers on which V2 and V1 are wound are shown in Figures 2 and 3 respectively.

As shown in Figure 2, V2 comprises a strip or former of insulating material having as shown three sections Z, Y, X, each of constant slope which is not too steep. In the example shown the sections are two, one and a half, and two, inches long respectively. Each section is wound with a different gauge of resistance wire, for example 33 gauge enamelled Eureka, 40 gauge enamelled Eureka and 44 single silk nickel-chrome wire respectively, so that the resistance of the largest and final turn of the first section Z approximately equals the resistance of the smallest and first turn of the next section Y, and similarly for the final and first turns of Y and X respectively.

Even with the arrangement shown in Figure 2, the desired wide variation of backing off current could not be achieved on a single series resistance strip of proportions suitable to a commercial instrument.

A former of the shape shown in Figure 3 is therefore employed for the potentiometer V1. This is so connected that the voltage provided by the variable resistance V^1 decreases as the resistance provided by V^2 is increased. Moreover, this potentiometer is shaped so that the increase in voltage per degree of angular rotation is not constant. It will be seen that the overall change in slope of the current/rotation characteristics of the combined arrangement is very steep. Moreover, as at minimum backing off current the voltage is decreased to a very small proportion of the total voltage, the maximum series resistance necessary can be considerably reduced, and with the arrangement shown a maximum resistance for a backing off current of less than 1/10 *m*A is only about 2000 ohms. The insulating strip of the element V^1 as shown in Figure 3 increases regularly and has a length equal to the overall length of V2. This strip may be wound with 37 gauge enamelled nickel-chrome resistance wire but an unwound portion *a—a* is left at one end to serve as an " off " position for the co-operating slider V3 (Figure 1).

The two strips V1 and V2 may be bent in the form of almost complete rings and the slider V3 is arranged to wipe over that side of each strip which is not sloped.

With the foregoing arrangement the ratio between the resistance of the first and smallest turn of Z to the last and largest turn X can be made quite large and the change in the current resistance slope is also correspondingly steep. One end of V2 is connected to the slider of the potentiometer MA/V through a limiting resistance F*x* of, say, 50 ohms and a rectifier R.

The combined effect of this arrangement is to provide a backing off control which gives a much more nearly linear increase of current per degree of angular rotation of the set zero control, than would be the case if a plain series resistance control were utilised. The backing off current is left unsmoothed so that the ripple on the backing off current will counteract any slight vibration of the meter needle due to the pulsating nature of the D.C. anode current obtained from a valve under test.

The potentiometer MA/V which is in effect a universal shunt across the meter ME has a setting marked 100 and when the slider Mx is set to this point the meter has a full scale deflection equivalent to 100 milliamps. The slider is also connected to multi-contact rotary switch or anode selector AS.

The meter ME which is of the moving coil D.C. milliammeter type, has its face or scale marked to indicate the mutual conductance in milliamps per volt of the valve under test. A further scale is provided which is divided into three parts, differently coloured and marked " good," " indifferent " and " Bad " or " Replace." There is also a scale marked C.Ins.-Megohms for indicating the cathode to heater insulation of an indirectly heated valve.

The arrangement of the meter is as shown in Figure 5 where the total universal shunt is shown as the series of resistance E—K. The portion EF is a small low value fixed resistance accurately calibrated, terminating in a gold-silver alloy contact F. FG is a further accurately calibrated resistance terminating in a gold-silver alloy contact G. GH is a variable resistance strip and HK is a resistance whose value can be adjusted after the whole is assembled. The contacts F, G, are carried on the end of the variable resistance strip GH, and are so arranged that the slider of the universal shunt can travel from H to G and then on to contact G and finally on to contact F. The resistance values are so arranged that when the slider is at H, the effective range of the meter is about 1 *m*A full scale. As the slider is moved towards G the effective full scale deflection of the meter is increased slowly until when it is on the contact G it reads accurately 10 *m*A full scale. The resistance HK can be adjusted to counteract small errors in GH which would otherwise upset the