## THE GAUGE.

With the view of making the preparation for this work as nearly perfect as possible, I have had a gauge made in steel for instrument measurement. It consists of a circular head graduated in hundredths, and an attached bar ruled in parallel lines for the measurement of angles. The bar is also graduated in millimeters for the measurement of lengths. For the measurement of widths a supplemetal bar extends beside the main bar, leaving between the two bars a gradual widening or V-shaped space, which is graduated in tenth-millimeter widths up to fifty-tenths or five millimeters. This is found very convenient for the measurement of widths of blades, the sizes of plugger points, and the diameter of burs.

## FORMATION OF FORMULA NAMES.

For the formation of formula names of excavators, three points are considered, viz., the width of the blade, the length of the blade, and the angle of the blade with the shaft. All other points are left to be guided by the rules that have been given in Part First. These (width, length and angle of blade) are very exactly the points that go to make up the individuality of the several instruments of any order, sub-order, class or sub-class, and will certainly identify each. The particular conformation of the shanks and handles are left to the individual manufacturer, or to the taste of the person ordering instruments. Neither is it considered important to this system that the angles be made sharp and definite, or that they be made in the form of moderately short curves. All such points in construction can be left to the taste of the manufacturer. At least the system now proposed does not take them into consideration.

## THE MEASUREMENT OF INSTRUMENTS.

In the measurement of instruments for the formation of formula names, first try the width of the blade in the V-shaped slot of the gauge, which will give the width in tenth-millimeters, and set this down as the first figure of the formula. In this the tenth-millimeter is to be used as the unit. Next measure the length of the blade from the centre of the angle to the cutting edge in millimeters and set that down as the second figure of the formula. In this the millimeter is used as a unit. Third, find the angle of the blade with the shaft and set that down as the third figure of the formula. In making this last measurement, lay the handle of the instrument on the main shaft of the gauge, parallel with the parallel lines, and with the point turned towards the small number of the circular head. Now move the instrument until the angle of the blade coincides with one of the lines graduating the circle, being careful to keep the handle parallel with the parallel lines.