The metal to be vaporised was placed in the cup BB, and when the cover C was replaced and the burner lighted the flame of a blow-pipe was directed against the cup. The vaporised metal in escaping was thus made to pass directly into the flame of the burner.

The second form of burner used is shown in fig. 2. To the top of an ordinary Bunsen burner Q a brass cylinder KL, 3·8 cm. in diameter and 8 cm. high, was soldered. The top was closed by a lid containing an aperture in the centre 1·8 cm. in diameter, to which a small tube 0·5 cm. high was attached. Another brass cylinder, 2·8 cm. in diameter and 7 cm. in length, was supported in the centre and coaxially with KL by means of three asbestos plugs. This inner cylinder contained a quartz tube F, 1 cm. in diameter and about 8 cm. in length, drawn off to a neck about 0·5 cm. in diameter at the upper end. A coil of manganin wire MN was wound round this tube, and the ends were led out through two openings fitted with small porcelain plugs in the bottom of KL. A layer of asbestos paper was placed round the wire and then the whole space between the tube and the brass cylinder next to it was filled with plaster of Paris, which on solidifying kept everything rigid. The top of the quartz tube F came just level with the mouth of the burner. When the gas was lighted a large clear Bunsen flame was easily maintained above the mouth of the burner. The metals to be vaporised were placed within the quartz tube F and the furnace was raised to whatever temperature was desired by supplying a current of suitable intensity to the circuit MN. With each metal a fresh quartz tube was used and care was taken to thoroughly clean the burner before taking the photographs. The photographs of the flame spectra were taken first with a small Hilger quartz spectrograph, type A, and afterwards with a larger one of the type C.

3. *Bunsen Flame Spectra.*

The spectrograms taken of the different spectra are shown in the plate at the end of the paper. No. 1 is a reproduction of the spectrum of the clear Bunsen flame free from all metallic vapours. No. 2 was obtained with mercury vapour. In addition to the ordinary Bunsen flame spectrum this spectrogram shows that the mercury line $\lambda = 2536{\cdot}72$ Å.U. came out strongly. No. 3 is a spectrogram of Bunsen flame spectrum of cadmium vapour and was obtained with the flame burning very gently. It shows the characteristic line $\lambda = 3260{\cdot}17$ Å.U. No. 4 is the Bunsen flame spectrum of magnesium. It shows the line $\lambda = 2852{\cdot}22$ Å.U. faintly but clearly in addition to the three flame spectrum. No sign of the line $\lambda = 4571{\cdot}38$ Å.U. was found in any of the spectrograms taken with this metal. No. 5 is the spectrum obtained with thallium vapour. In this case the only characteristic