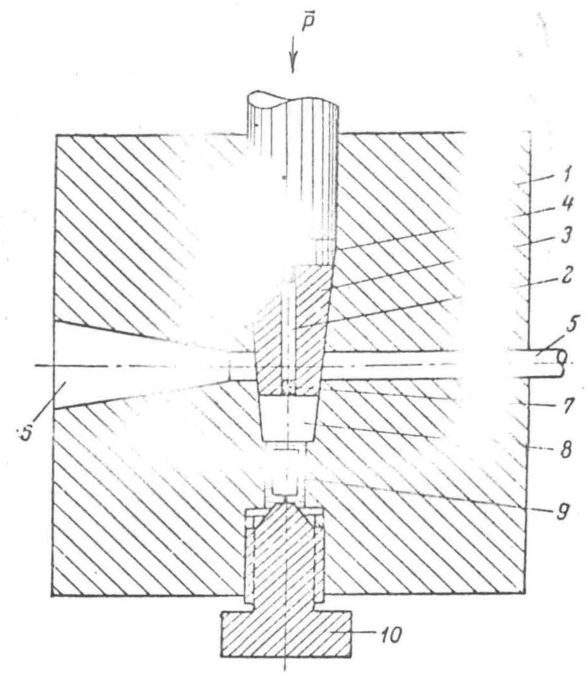

Fig. 4. High-pressure chamber for x-ray diffraction in which the beryllium container (3) plays the role of the conical piston. The sample (2) is placed in the channel made in the beryllium container; the upper part of the channel is closed by the conical compressor (4); the lower part of the channel is closed with a lithium stopper (7). The x-rays pass through the diaphragm (5), and through the sample. The diffracted rays pass through the slit (6). The empty part of the chamber is filled with benzine (8); the pressure is determined by the change of the electrical resistance of the manganin manometer (9), fixed on the electrode (10).

cylindrical casette of special construction, which was 114 mm in diameter, allowed us to obtain 4 photographs on the same film. In the case of barium, we used x-rays obtained with a molybdenum anticathode. The exposure time was 7-8 hours. Up to 9 lines were visible on the x-ray diffraction pattern of the sample in the beryllium container. The photogram of one of the films is represented in Fig. 6. The lower curve is relative to the sample under a pressure of 10,000 kg/cm^2. One can clearly see the displacement of this curve with respect to the upper curve, which corresponds to the sample not subjected to pressure. The extreme left, undisplaced peak corresponds to the hair line made for reference.

Knowing the relative change of the interplanar distance with pressure, one can deduce the relative change of volume with pressure. In the range of pressures investigated, this relationship can be expressed by the following equation:

$$-\frac{\Delta V}{V_0} = aP + bP^2.$$

By the method of least squares we obtained the following values of the constants for strontium:

$$a = 81.0 \cdot 10^{-7} \pm 1.4; \; b = -101.1 \cdot 10^{-12} \pm 3.4.$$

Calculations on the basis of the face lines when the diameter of the compression chamber is relatively small (80 mm) leads to considerable errors; however, by smoothing the curves, one can obtain for $\Delta V/V_0 = f(P)$ much more precise values.