them. The medium which transmits the pressure (lithium), *19*, fills part of the channels of supports, *9*, and , *14*, and the inside space of the beryllium chamber, *24*. It is compressed by the pistons in the upper and lower supports by means of screw, *17*, and also the lower screws in column, *2*. In this way

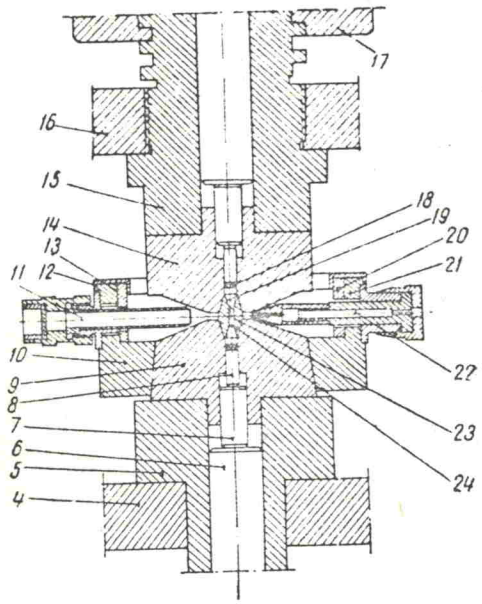

FIG. 1. Diagram of high pressure X-ray chamber.

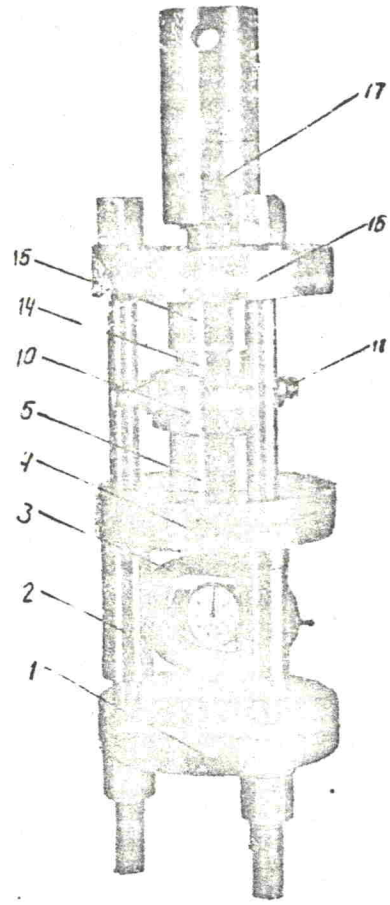

FIG. 2. General view of a high pressure apparatus.

the pressure created in the channels of the upper and lower supports is transmitted to beryllium chamber, *24*, and specimen, *23*.

The creation of pressure does not require very considerable force. In our experiments a pressure of up to 10,000 kg/cm² was easily created in the apparatus, which was on the supporting table of the X-ray tube. The position of the specimen inside the beryllium chamber was checked by means of the fluorescent screen. The maximum pressure created in the apparatus was 18,000 kg/cm². Piston, *8*, and the piston in the upper chamber corresponding to it were made of steel R18 with subsequent quenching to Rockwell hardness of 62. Paraffin wax, *18*, was used for packing, in the form of 2-3 mm high cylinders.

High pressure vessel. The experiments showed that the degree of purity, grain size, previous deformation and nature of the heat treatment of beryllium all affect the level of the working pressure in the apparatus, the quality of diffraction patterns obtained and the life of the high pressure vessel, i.e. the beryllium chamber. Home-produced beryllium was used for the high pressure vessel.

We observed the following order in manufacturing the beryllium chamber. First of all the chamber was made in the shape indicated in Figs. 1 and 3, height 12 mm, internal diameter 1 mm, external diameter 7 mm, internal taper 30°. The optimum taper figure was found experimentally as a result of a series of experiments with chambers of different geometrical dimensions. Then the inner and outer tapers were carefully ground, and the cylindrical inside of the chamber. After this it was filled with lithium, placed in the apparatus and a pressure of 10-12,000 kg/cm² was created. The pressure was raised and lowered 2-3 times. Then the surface finish of the chamber was further improved and it was given a heat treatment to produce a coarse crystalline structure in the beryllium. It was placed in zirconium crucibles in a quartz tube in which a vacuum of 2×10^{-5} mm