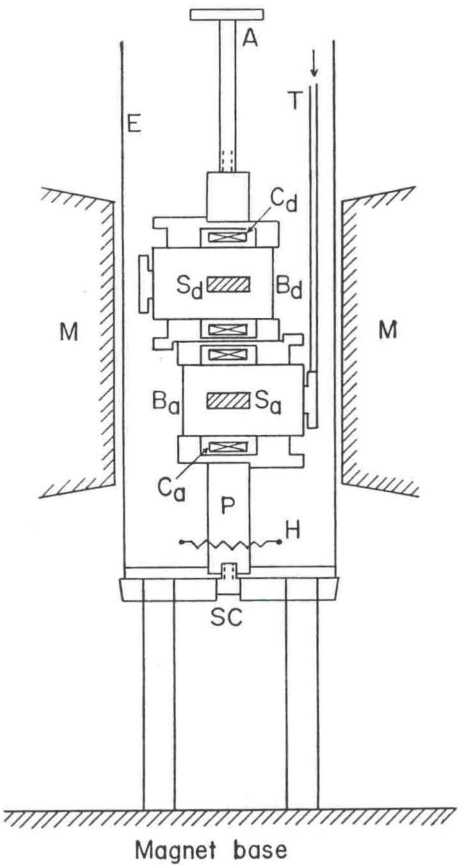
hardened beryllium copper, being 42 mm in length, 5.5 mm in inner diameter and 25 mm in outer diameter. The bomb bore the strength test up to 18 kbar, but the highest working pressure which has usually been applied is 15 kbar. The same specimens are inserted in both the bombs. The lower bomb B_a is used as an active one, suffixed with a, in which the pressure is applied, and the upper bomb B_d as a dummy, suffixed with d, in which no pressure is applied.

The detailed construction and arrangement of the bomb assembly are schematically shown in Fig. 2, where the active bomb is represented. The bomb is fixed with six screw S_1–S_6, three at the one side of the bomb, to the coil holder CH made of copper. In the figure only S_1, S_2, S_4 and S_5 are



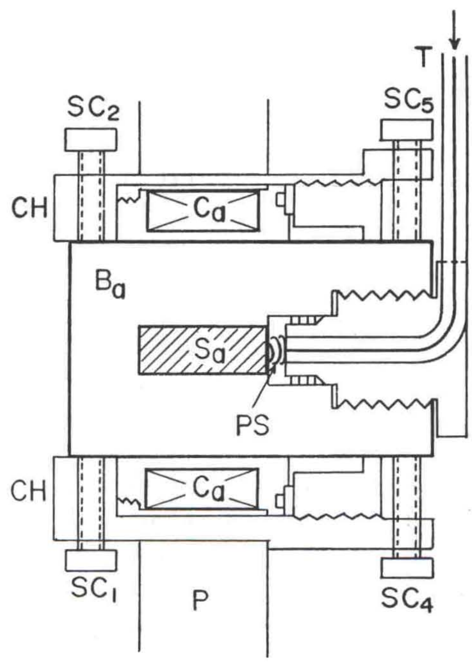


Fig. 2. Diagram of the active pressure bomb
B_a: Active bomb, S_a: Active specimen,
C_a: Active search coil, CH: Coilholder,
PS: Phosphor bronze spring,
SC_1, SC_2, SC_4 and SC_5: Screws,
P: Holding plate, T: Transfertube.

Fig. 1. Schematic diagram of principal assembly of apparatus for the measurement of the variation of saturation flux with pressure.
M: Electromagnet, B_a and B_d : Active and dummy bomb,
S_a and S_d : Active and dummy specimen,
C_a and C_d : Active and dummy search coil,
P: Holding plate, H: Heater, E: Stainless steel bath, T: Transfer tube, A: Adjusting screw,
SC: Screw.

shown. The coil holder, in which the active coil C_a is mounted, is fixed to the thick holding plate *P*, which is also made of copper. The active specimen S_a is slightly pressed against the left inside wall of the bomb with a phosphor bronze spring *PS* inserted between the specimen and the plug, so that it may be unmovable by the application of the magnetic fields. A stainless tube *T* for transferring the pressure from the generator is connected to the plug of the bomb. The assembly of the dummy bomb is just the same as that of the active bomb, except for the transfer tube.

In Fig. 1, the active bomb assembly is fixed to the holding plate *P*, while the dummy assembly is slightly movable up and down with an adjusting screw *A*, so as to vary the space between the active and dummy bombs. The holding plate is tightly fixed with a screw *SC* to the bottom of the stainless steel bath *E* which is mounted to the base of the magnet, as shown in Fig. 1.

The coils C_a and C_d were wound on a thin bobbin in the same way with the same total turn number. Their length, effective diameter and total turn number are 13 mm, 42 mm and 3,000, respectively. The bobbins were made of copper and bakelite. The copper bobbin was used for the measurement below room temperature and the bakelite bobbin for the measurement above it.

The active and dummy coils are set parallel to each other and they are connected in series and opposite sense, so that no resultant flux might be induced in the absence of pressures. In practice, however, the state of complete cancellation was not a stable one. A practically stable state could be obtained as the one with a small resultant flux resulting from the adjustment of the space between the active and dummy bomb assemblies.

The flux has been determined by means of a ballistic galvanometer, and lamp and scale, and given as a deflection occurring in the reversal of an applied magnetic field strong enough to magnetize the specimen to saturation. The reversal of the field could be done instantly with that of a mechanical switch. The change in Φ'_s, $\Delta\Phi'_s$, which is caused by an increase in pressure, Δp, is determined from the difference between the deflections of galvanometer in the absence and the presence of a pressure. One run of this measurement is composed of three steps: (i) under no pressure, (ii) applied pressure and (iii) again no pressure as is shown in Fig. 3. In this figure, the abscissa is the time and the ordinate is the deflection angle of galvanometer. At each step, several measurements were done at regular time intervals, as shown in the figure. The suitable interval was determined in advance, so as to get the stable base in the absence of pressure as shown in the figure. After making one run measurement, $\Delta\Phi'_s$ has been obtained from the deflection of the galvanometer, $2\Delta\theta$.

The cancellation of the fluxes in the coils C_a and C_d is scarcely changed by the fluctuation of temperature and field, since the active and dummy assemblies are just the same constitution and also at almost the same condition,