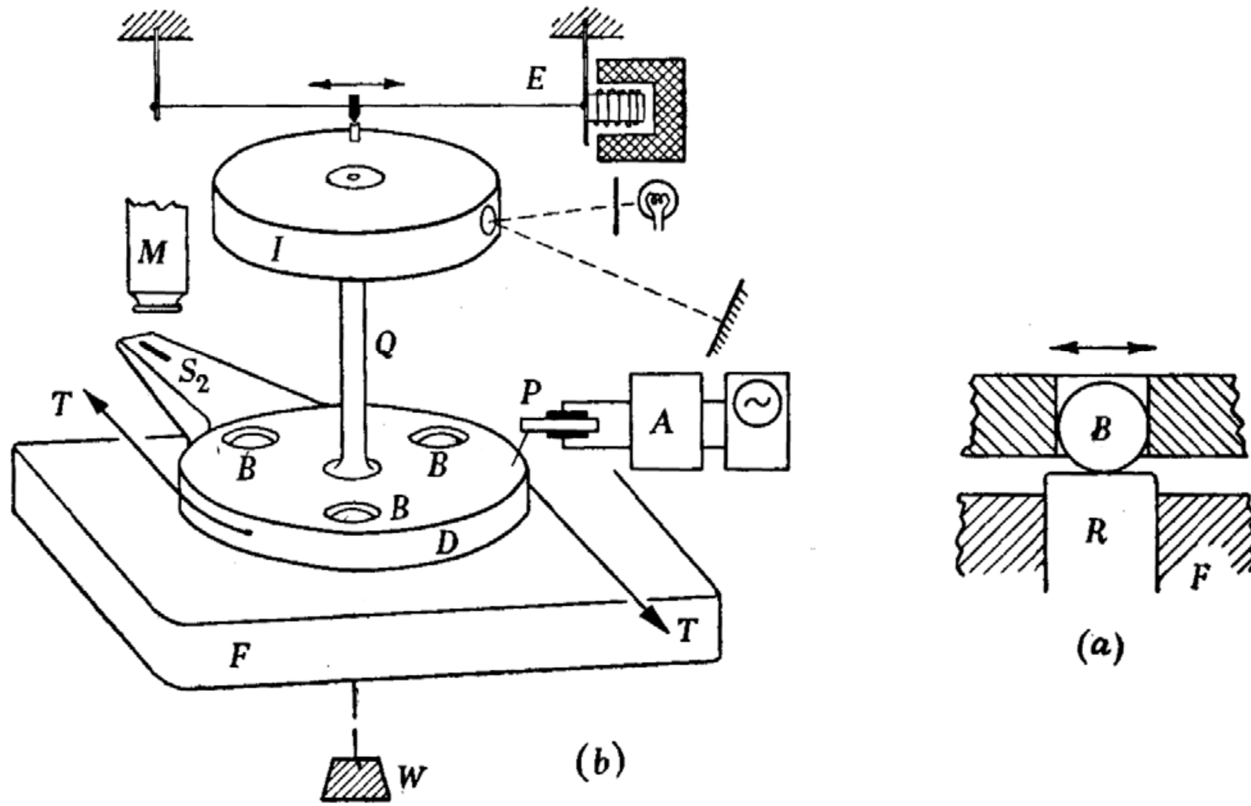


FIGURE 2. (*a*) The contact of a steel ball B held in disk D with flat end of steel roller R held in base plate F. (*b*) Diagram of apparatus. Normal load is provided by W. Static shear forces are applied by strings T and static displacements measured by microscope M. Oscillating shear forces are applied by torsional vibration of the disk I and the displacements measured by the pick-up P and amplifier A.

Johnson, K. L. ‘Surface interaction between elastically loaded bodies under tangential forces’ Proc. Roy. Soc A230 (1955) 531-548

Mindlin, R. D. ‘Compliance of elastic bodies in contact’ J. Appl. Mech., Trans ASME 71 (1949) 259

Bowden, F. P. and Tabor, D. ‘Friction and Lubrication of Solids’, Oxford University Press, 1950

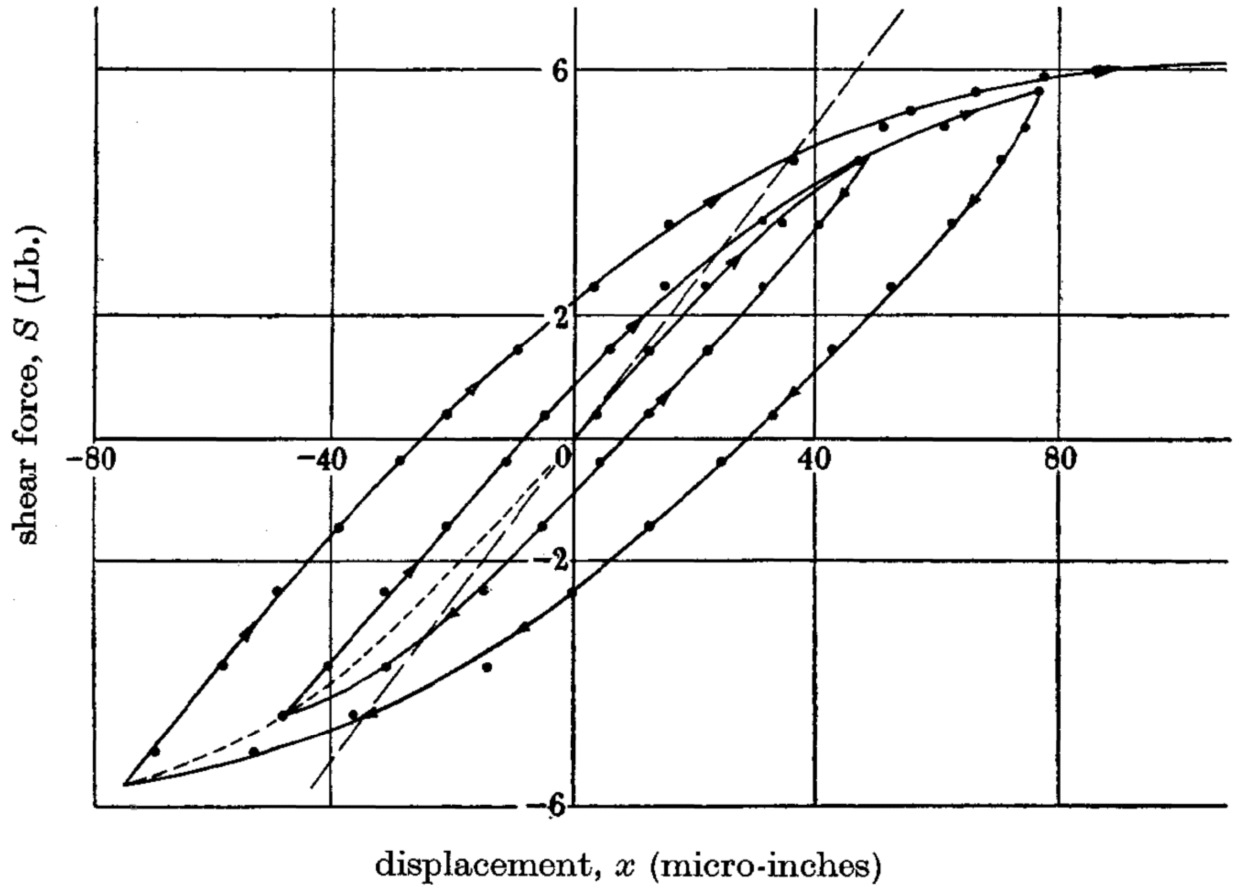


FIGURE 5. Static hysteresis loops. These results show that the major component of the displacement is elastic. On reversing the load a closed symmetrical loop is traced out in which $x(-\bar{S}) \simeq -x(\bar{S})$. $D = 0{\cdot}375$ in.; $N = 13{\cdot}9$ Lb.

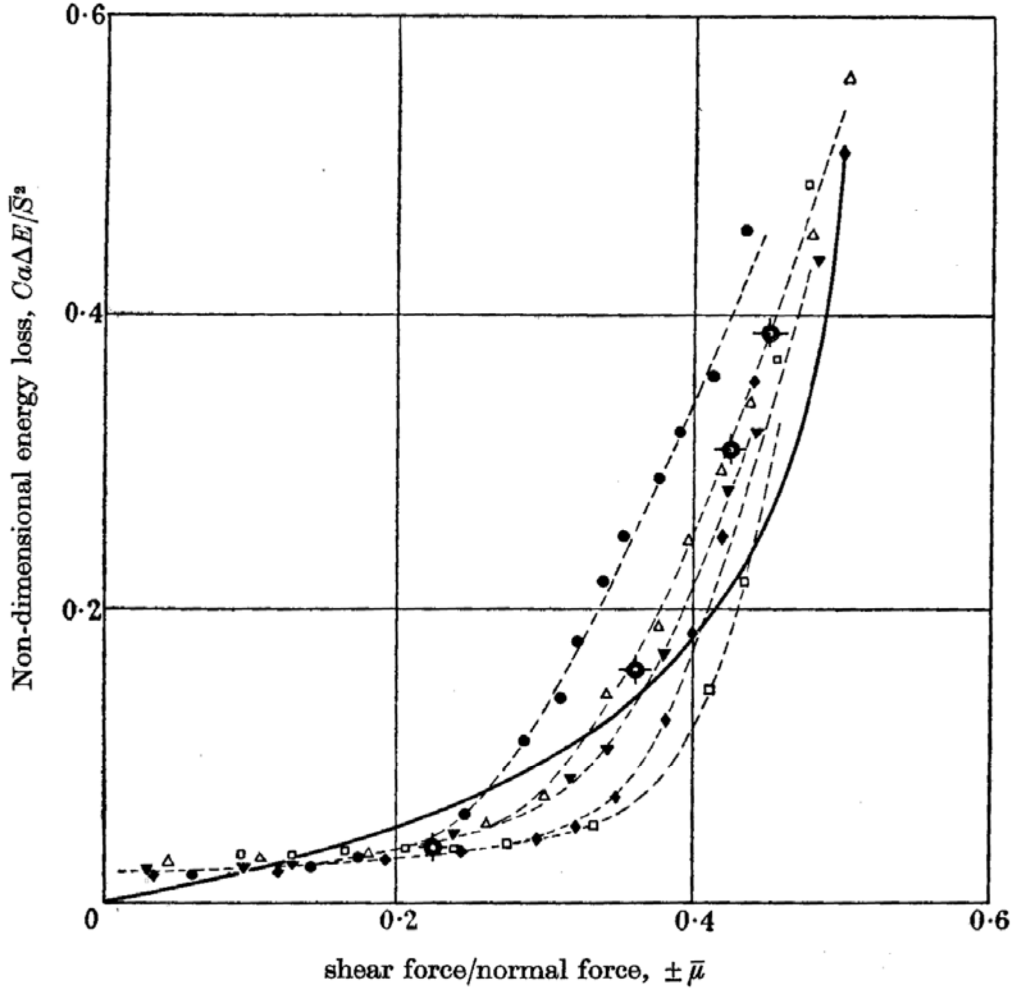


FIGURE 9. Non-dimensional correlation of the results of the damping tests. The full curve represents Mindlin's theoretical relationship given by equation (3) taking $\mu_s = 0{\cdot}5$. The values indicated ⊕ were obtained from static hysteresis loops.

Johnson, K. L. ‘Energy disspiation at spherical surfaces in contact transmitting oscillating forces J. Mech. Engng. Sci. 3 (1961) 362-368

Mindlin, R. D. and Deresiewicz, H. ‘Elastic spheres in contact under varying oblique forces’ J. Appl. Mech., Trans ASME 75 (1953) 237

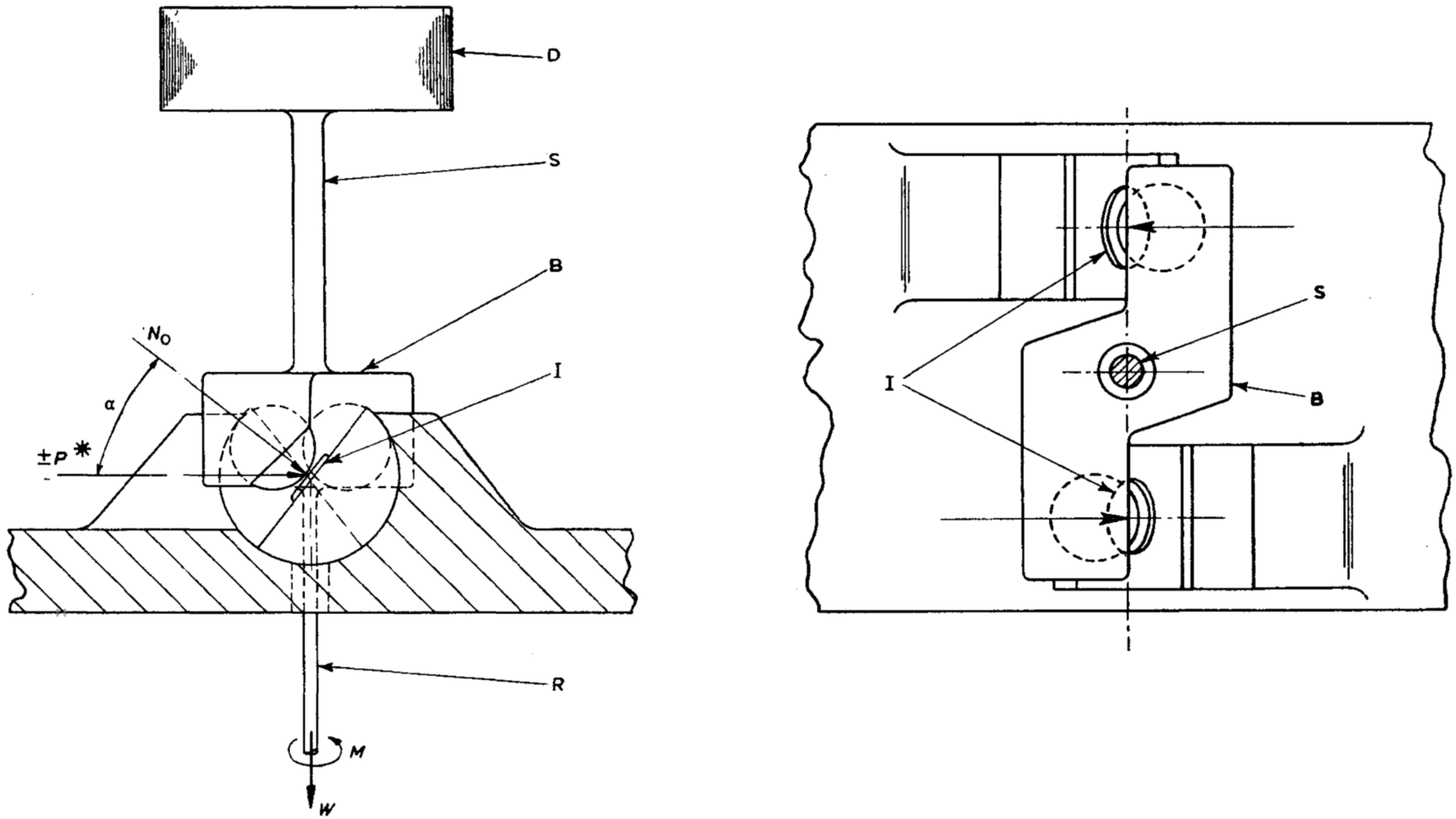
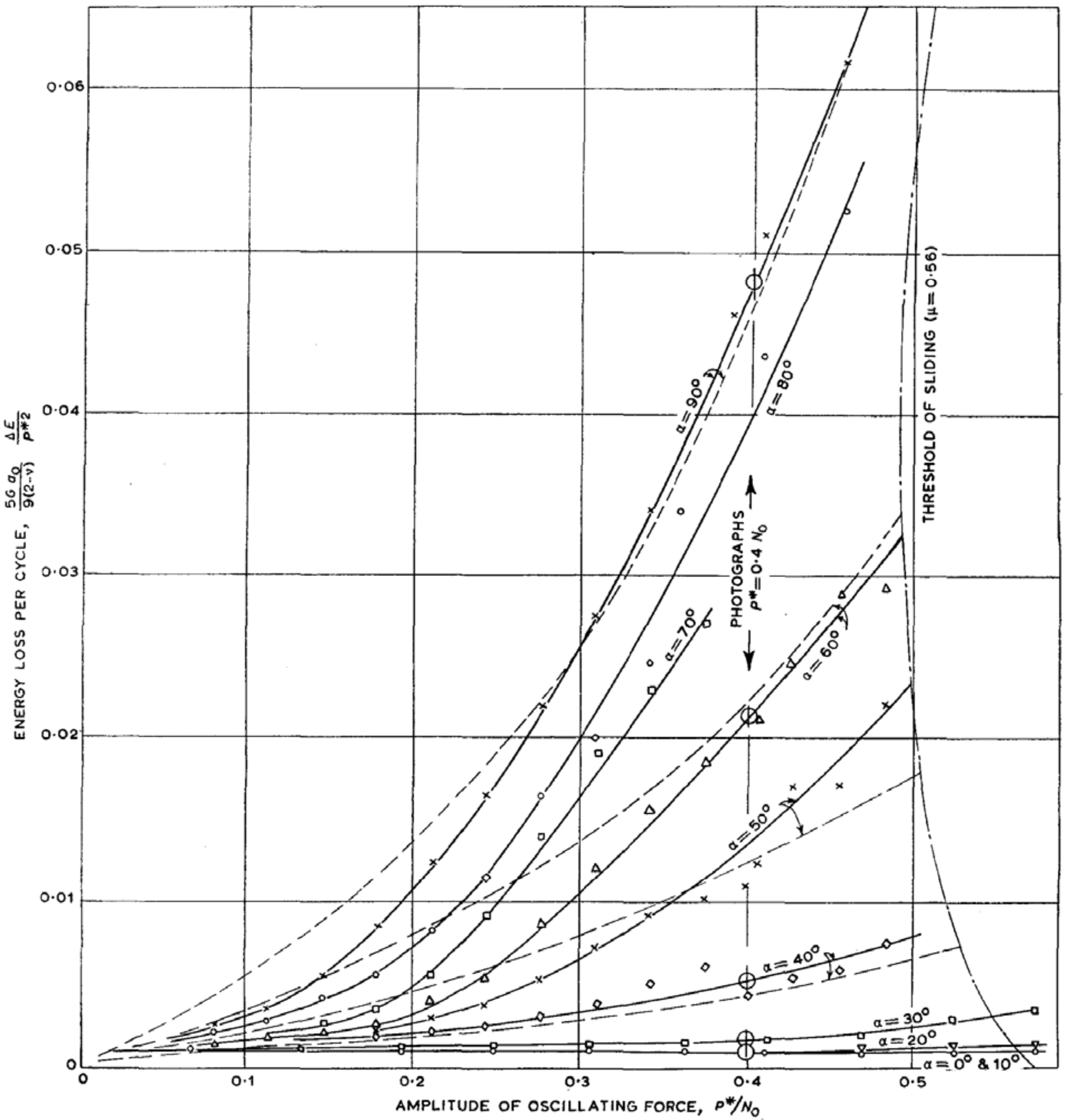
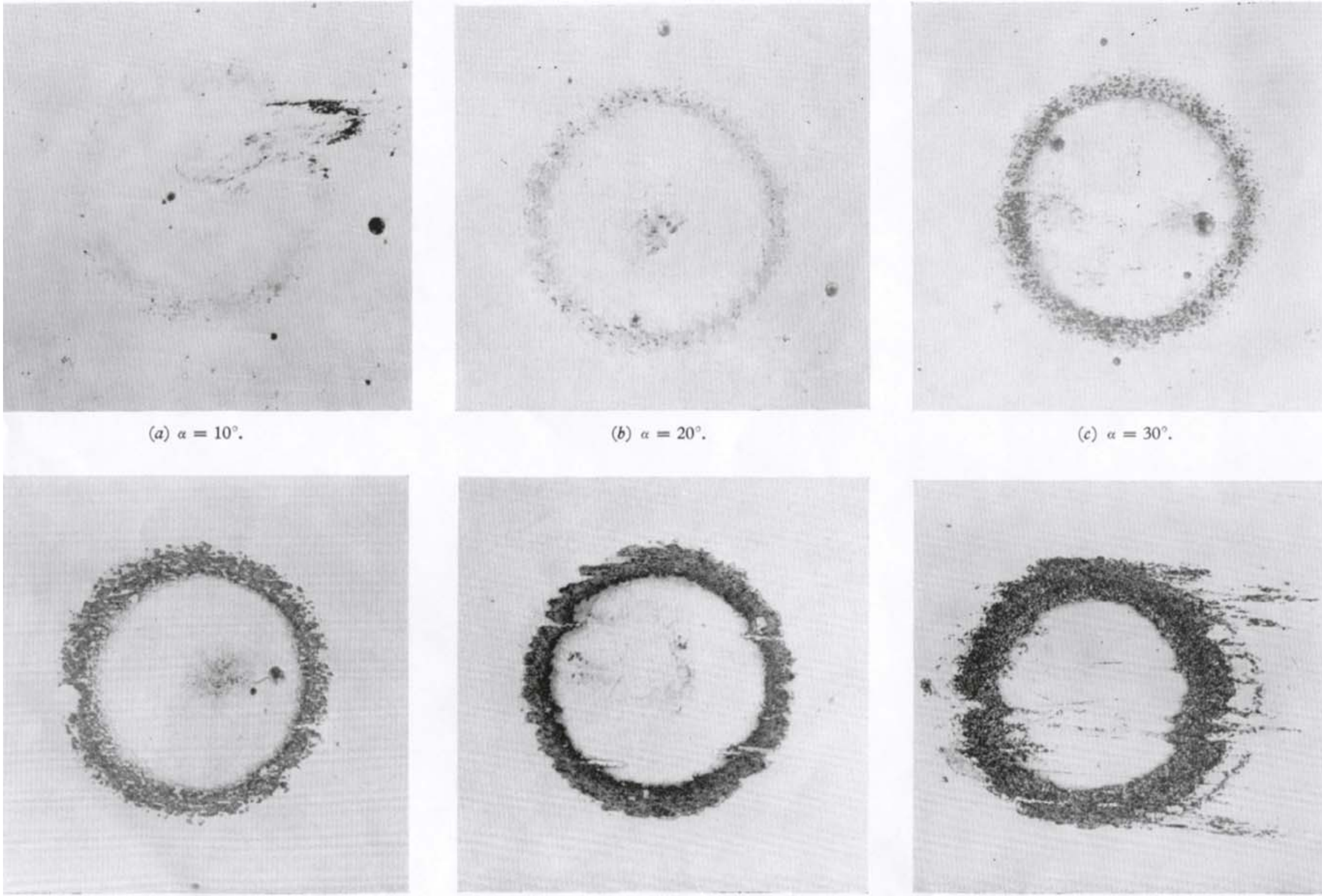


Fig. 3. *Apparatus for measuring the energy dissipation at the contact of a sphere and a plane under the action of an oscillating oblique force*



× ——— Experimental. — — — Theoretical (equation (6)) taking $\mu = 0{\cdot}56$.

Fig. 4. *Results of energy dissipation measurements at various angles of obliquity*



(*a*) $\alpha = 10°$. (*b*) $\alpha = 20°$. (*c*) $\alpha = 30°$.

(*d*) $\alpha = 40°$. (*e*) $\alpha = 60°$. (*f*) $\alpha = 90°$.

$N_0 = 20$ lb, $a_0 = 0{\cdot}0077$ in.

Fig. 5. *Fretting damage after 10 000 cycles at a constant amplitude* $P^* = 0{\cdot}4N_0$