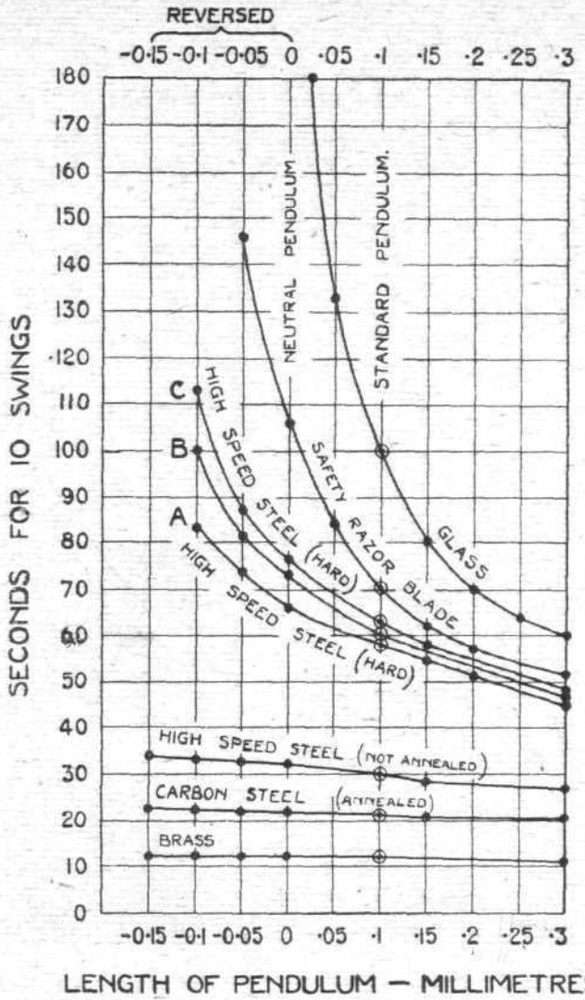
A PENDULUM HARDNESS TESTER

A NEW, and extremely ingenious, instrument for testing the hardness of materials, ranging from lead to sapphire, has recently been produced by the well-known makers of testing machines, etc., Messrs. Edward G. Herbert, Ltd., of Atlas Works, Levershulme, Manchester. This instrument, which is known as the Herbert Pendulum Hardness Tester, is very simple both in principle and in operation, and may briefly be described as consisting of a pendulum four-thousandths of an inch long, which is balanced on a ruby or steel ball of one millimeter diameter. When this pendulum is balanced on the substance to be tested, and is set swinging by a touch with a feather, it indicates the hardness of the surface on which it rests by the time of the swing, which is read by means of a stop watch. There is also another method of testing with this instrument, which will be referred to later. The complete instrument weighs 2 kgs., or 4 kgs., as required.

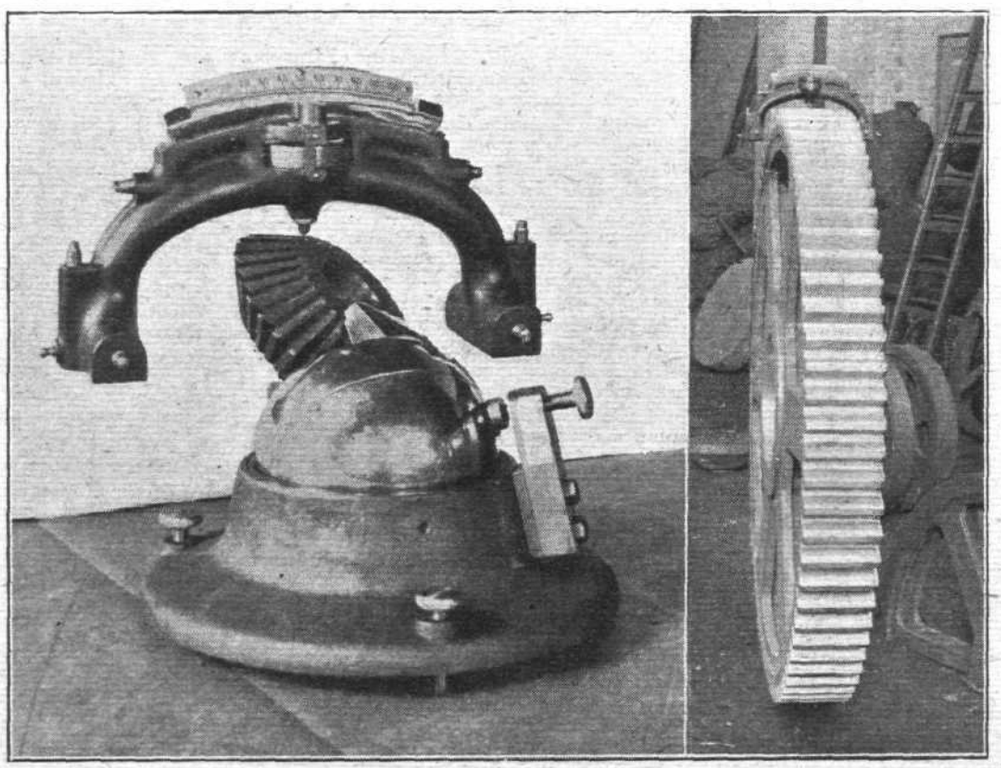
The principal advantages claimed for this instrument are as follows: It dispenses with all microscopic measurements and difficult readings, and, as it does not depend on impact, the readings are in no way affected by the mass or inertia of the specimen. Heavy loads are not used, and the test may be applied to thin and fragile articles without risk of breakage or defacement of the finished surfaces. Furthermore, the instrument is extremely simple and quick in operation, and being portable is very easily applied to almost any object in the workshop or the laboratory.

To describe the instrument more fully, it consists of a crescent-shaped casting at the inner centre of which is a steel or ruby, ball, one millimetre in diameter, held in a chuck, and six screwed weights are provided whereby the position of the centre of gravity of the whole instrument may be adjusted to coincide with the centre of the ball. Immediately above the ball is a graduated weight mounted on a screw. By raising or lowering this weight the centre of gravity of the instrument can be brought to a predetermined distance above or below the centre of the ball. The graduations on the weight show displacements of the centre of gravity in hundredths of a millimetre. A curved tube and bubble, with a scale graduated from 0 to 100, are mounted at the top of the instrument.

The centre of gravity being at the centre of the ball, the instrument is in neutral equilibrium when supported by the ball on a hard level surface. It tends to remain in any position in which it may be placed, whether upright or tilted at an angle. If the centre of gravity is above the centre of the ball the equilibrium may be unstable, in which case the instrument tends to lie down. If the centre of gravity is below the centre of the ball the equilibrium is stable. The instrument thus constitutes a pendulum oscillating about its central position, the time of oscillation being greater as the length of



THE HERBERT PENDULUM HARDNESS TESTER: Curves showing relation between length of pendulum and time of swing—time test.



The Herbert Pendulum Hardness Tester: On the left, testing a cutter, held in a special ball vice, and, on the right, testing a large gear wheel.