The herein given procedure for testing wire and strip for stiffness, with a Model No. 719-H Wire Stiffness Tester is standardized.

1. EQUIPMENT

Model No. 719-H Wire Stiffness Tester (refer to figure, p.2) will measure stiffness of wire from 10 to 117 mils in diameter and strip up to 3/8" wide x .050" thick, depending upon nature of material. The beam of the tester is supported by pivots on a bracket which can be rotated about axis of pivots. This bracket carries clamping jaws, the bending edge of the fixed jaw being in line with the pivots. The loading edge and fixed jaw are on same side of test specimen so that specimens of large and small diameters or thicknesses can be tested without having to make readjustments when specimens are straight. The weights for supplying the load during testing can be attached to the beam at distances from 6 to 16 cm from pivots and weigh 1, 10, 20, 50, 100, 200 and 500 grams respectively. The load can therefore be varied from
→ *60 to 8000 gramcentimeters.

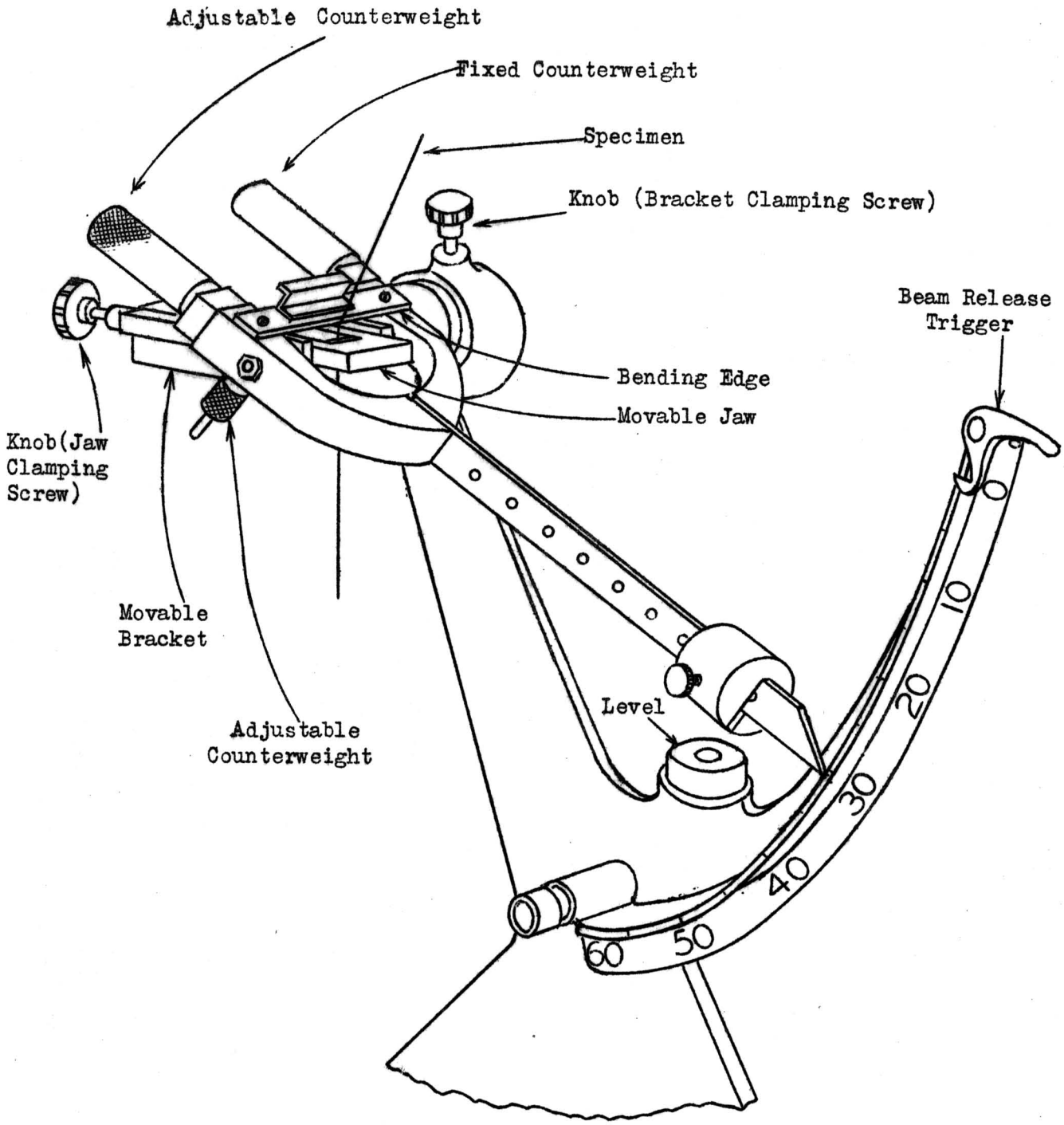
The construction of the weights is such that, when placed in position on beam, their centers of gravity lie in horizontal plane of the pivots. A cross piece comprising two loading edges is mounted on upper side of beam, thus permitting specimen and loading edge to be seen readily. Depending on mounting of cross piece, the dis-
→ tance from jaws to loading edge may be either 5 mm or #10 mm with one crosspiece and 10 mm or 20 mm with another crosspiece.

The base of the tester is provided with two leveling screws and a liquid level is attached to frame. The tester has been designed to give sensitivity, without sacrifice of ruggedness, together with ease and convenience in testing. Consequently, accurate readings can be made very rapidly. The beam is equipped with counterbalancing weights in vertical and horizontal planes thru axis of pivots.

2. MAKING STIFFNESS TESTS

In principle this tester applies a load to the specimen supported as a cantilever beam and bends it thru an angle. The load should be applied at a distance of *5mm on short leads that cannot be used with 10 mm test distance; and at 10 mm on long leads to and including .060" diameter. For larger wire the 20mm loading edge should be used. Size of weight selected and its position on beam should be such that when beam is released and allowed to fall, its tip will drop to somewhere between 30 and 60 degrees on the scale. The load should never be so light as to per-
→ mit the beam to stop at a point less than *30°. A small weight and a long lever arm should be used whenever possible in preference to a heavier weight and a short lever arm. The final position of the beam is a measure of stiffness of wire because as the wire is being bent by the load it increases its resistance due to cold working effect of the bending. At same time as the beam drops, the force it can exert on the wire diminishes as the cosine of the angle and finally reaches a value equal to resistance offered by wire - and the beam comes to rest.

# Indicates correction.



WIRE STIFFNESS TESTER

★ INDICATES A CHANGE ★★ INDICATES AN ADDITION

2. MAKING STIFFNESS TESTS (Cont'd)

Before using the tester it should be placed on a solid support and be adjusted for level. The beam should also be counterbalanced so that it will balance in any position.

By moving the knob at the left end of the beam up or down after the test specimen has been clamped into position, the latter can be brought into contact with the bending edge. Usually enough friction is given to the bracket by means of the adjusting knob at the rear of the supporting frame to permit ready adjustment of the position of the jaws. If the wires are always straight, adjustments for curvature of the specimens are unnecessary and the clamp screw may be tightened to hold the bracket in one position.

Since the stiffness of wire is increased by flexing it, it is important that the specimen is not bent in handling and in placing it in the tester. Furthermore if the specimen is not in contact with the loading edge, the beam will drop freely before striking the specimen and travel too far; or if the specimen is sprung by the loading edge when being clamped, the beam will not drop as far as it should. Consequently, the clamping jaws are mounted so that they can be rotated about the axis of the beam pivots, allowing the specimen to be brought into contact with the loading edge without springing the specimen and without requiring straightening.

(Checking Tester)

The sensitivity of the tester can be checked at any time by placing a 1 gram loading weight at the 7 cm position on the beam and allowing it to drop without a specimen in place. The load required to start the beam from rest is a measure of the friction in the bearings. If the friction becomes excessive the bearings should be cleaned and replaced.

3. PROCEDURE

With the tester level, the beam balanced, and using the correct bending edge, proceed as follows:

a. Clamp loading wieght of size and at location as specified for the wire to be tested.

b. Clamp test specimen between jaws, adjusting the position of the latter if necessary so that the specimen just touches the bending edge and no more. (In testing an inner lead the wire should be positioned in the tester so that the knot is outside the jaws above the bending edge.)

c. Release trigger at end of beam. The tip of the beam should come to rest between 30 and 60° on the scale.

d. As a check on the stiffness of the wire about three (3) specimens from a test lot should be checked.

e. Stiffness tester settings and limits for stiffness for wire are given in Confidential and Material Handling Stdzg. Notices, Sections 33C & 33, respectively.

STANDARDIZING SECTION
RESEARCH & ENGINEERING DEPT.