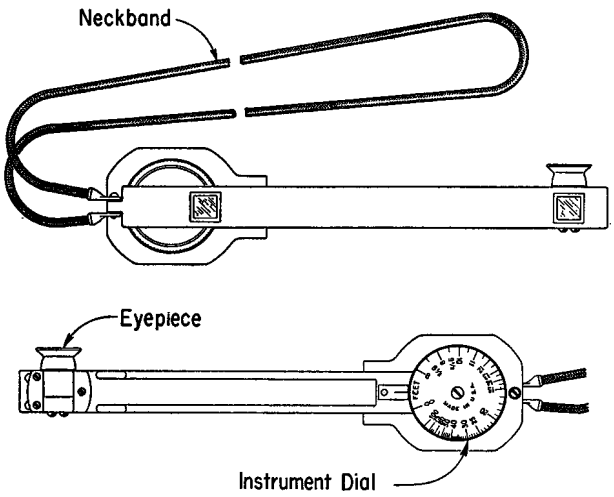
RANGE FINDER
DESCRIPTION AND USE

Contents **Page**

1. GENERAL

1.01 This practice describes the use of the Range Finder for measuring vertical clearances and separations.

1.02 This method of measuring vertical clearance employs a Range Finder consisting of a metal encased optical range finder having a 6-inch base length and an over-all length of 8-¼ inches. A prism at the eyepiece end of the instrument permits overhead objects to be observed and measured by sighting horizontally. The Range Finder is pictured in the following illustration:



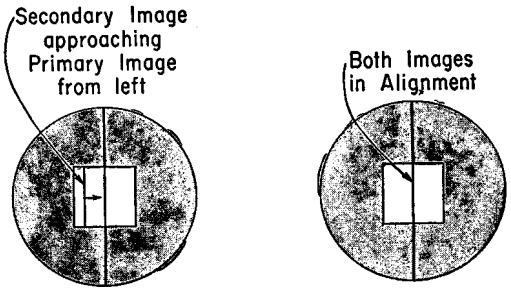
1.03 In use, this instrument indicates directly the distance between the observer's eye and an observed object, when the instrument dial is adjusted to bring two images of the object into alignment. The Range Finder will measure distances between 8 and 100 feet, and at distances between 30 and 40 feet the error should not exceed 2%.

1.04 The accuracy of the Range Finder should be checked occasionally, and at any time when there is any doubt as to the accuracy of the readings obtained. This may be done by laying out a distance of 35 feet along the ground, measured from a pole, and then sighting horizontally on this pole from this measured distance. If the error in measurement is more than 2%, the instrument should be returned.

1.05 The Range Finder should be handled with care to avoid damage which might affect its accuracy. If the instrument is dropped inadvertently or subjected to other shock, its accuracy should immediately be checked as outlined in **Paragraph 1.04.**

2. MEASURING GROUND CLEARANCE

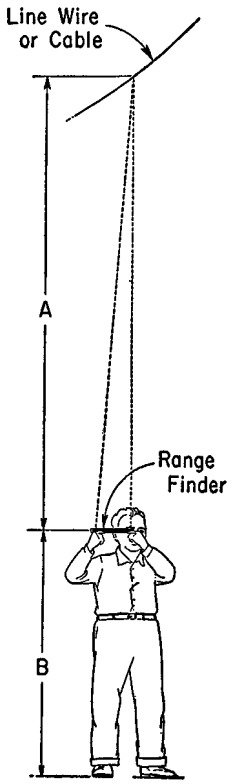
2.01 In using the Range Finder, the observer looks into the eyepiece while holding the instrument so that the two glass covered openings on the side will face toward the object to be measured. If, for example, it is desired to take a reading on an overhead wire, the Range Finder should be pointed so that the wire appears as a line across the full field in the instrument. The Range Finder should be held so that the image of the wire is centered in the small square that appears in the middle of the field. By turning the instrument dial, a secondary image, visible only in the inner square field, can be brought into alignment with the primary image of the wire, which is visible through the entire field of the Range Finder.



When the two images are in alignment, the Range Finder dial reading indicates the distance, in feet, from the observer's eye to the wire. For accuracy, it is suggested that the secondary image be caused to approach the primary image from the left. This is done by starting with the calibrated dial at infinity and rotating the dial clockwise until the two images are in alignment. If the dial is turned too far, back the dial up until the secondary image will again approach the primary image from the left. This procedure will avoid errors from any backlash that may exist in the Range Finder.

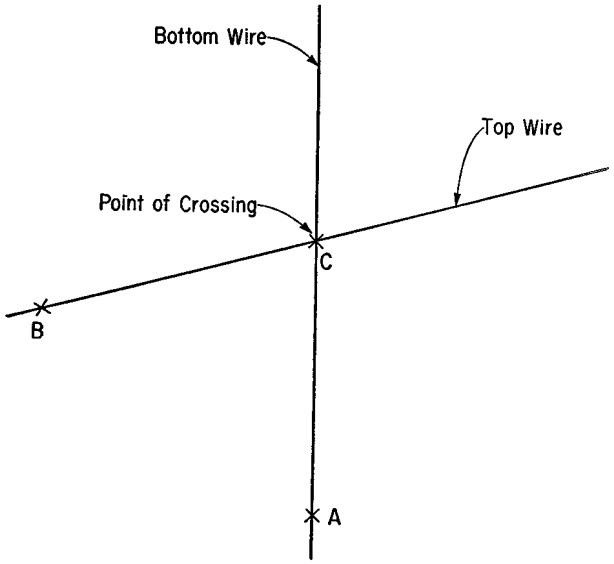
2.02 The use of the Range Finder in measuring ground clearance is illustrated below. When making measurements to overhead objects it is very important for the observer to stand directly below the object being observed, and that the Range Finder be held approximately at right angles to the wire or cable being measured.

1. Distance "A" - on Instrument Dial
2. Distance "B" - Height of Eye above Ground
3. Ground Clearance of Line Wire = A + B.



3. MEASURING VERTICAL SEPARATION

3.01 It is very important that measurements of vertical separations of aerial plant at crossovers be made from a point directly beneath the crossover. One method of determining the point of crossing within acceptable accuracy is as follows:



(1) From some point "A," underneath the bottom wire (if possible, at least 20 feet from the point that appears to be beneath the crossover) sight along the bottom wire and mark the spot that appears to be directly under the point of crossing, "C".

(2) From some point "B" (directly below the top wire) sight toward the crossover point and select a spot on the ground that appears to be directly under the point of crossing.

(3) Repeat the above process until the two points "C" thus selected coincide. The workman will be able to select, with sufficient accuracy, points that are in the same vertical plane as the wires. Point "C" is the point from which measurements will be taken.

3.02 When making measurements at crossings, it is not necessary to obtain ground clearances. The vertical separation of the two wires is obtained by subtracting the dial readings.

3.03 When measuring vertical separations of parallel wires, it is suggested that the observer select wires at outer end of crossarm, where possible, to avoid confusion. The observer should stand just sufficiently out of vertical plane so that he may view both wires concerned in measurement. See the following illustration.