

INSTRUCTIONS FOR  
OSBORNE FIRE FINDER

ASSEMBLY:

Packed with this Fire Finder are the following parts and materials:

- 1 - Part No. 1-15079 Handle for sight bearing ring.
- 1 - Part No. 1-15070 Rear Sight assembly with mounting screws.
- 1 - Part No. 1-15074 Front Sight assembly with mounting screws.
- 1 - Part No. 1-15090 Bisecting tape assembly.
- 1 - Part No. 15106 Wrench.
- 1 - Part No. 15107 Wrench.
- 4 - Wood screws and washers for mounting baseboard to stand.
- 4 feet spare nylon sight wire.
- 1 - #8 Allen wrench.

Attach parts to the sight bearing ring using the screws furnished. Follow the accompanying illustrations for placement.

Adjust center point to proper height; tighten setscrew. Adjust nuts at either end of bisecting tape. "0" on tape should be directly over center point of map disk. CAUTION -- do not put too much tension on tape.

Mount selected and prepared map on metal disk using shellac on both the disk and back of maps.

INSTALLATION

Use a sturdy, level, stand that is firmly attached to lookout floor. Screw Fire Finder to top of stand with tracks parallel to sides of lookout. Use the level vial furnished with instrument and make sure baseboard is level in both directions. Mount Fire Finder by fitting the grooves of the lower plate to any two of the three parallel tracks.

ADJUSTMENT

Adjust map to proper position with reference to the azimuth graduations. To do this, revolve the sight bearing ring until the zero or arrow mark on the vernier matches exactly with 0° azimuth. Leave the sight bearing ring in this position, loosen the screws around edge of map disk, and revolve it on the center pin.

The meridian line of map should lie directly under the steel tape which extends across center of instrument. Be sure that the north end of this line is adjacent to the front sight. Look straight down on tape to check alignment. Secure disk in place by tightening the screws.

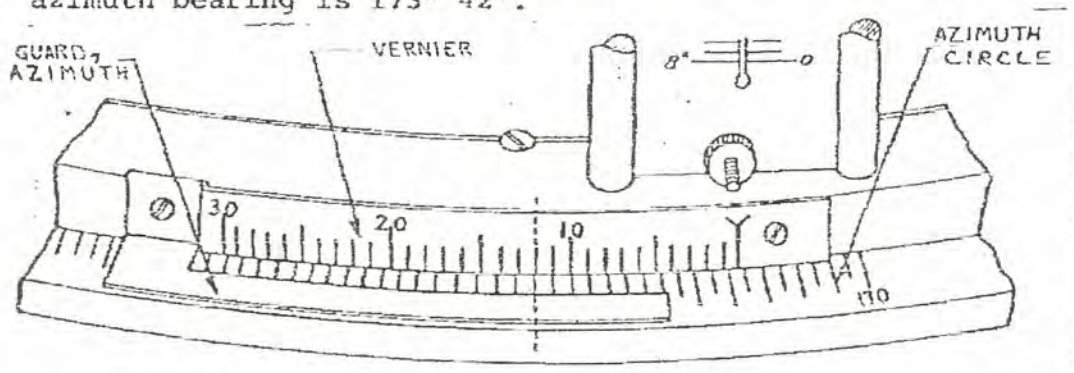
Level instrument as follows: Place level vial on machined surface of azimuth graduation following the illustration, "Leveling the Fire Finder".

To prevent errors in horizontal readings because of sideplays, keep guide lugs on the base of the Fire Finder below the center line of track. The slightest sideplay will make horizontal reading incorrect.

#### ORIENTATION

Assuming that the true bearing or azimuth to a well defined target (as another lookout house) has been determined (say  $173^{\circ} 42'$ ), the procedure is as follows:

Revolve sight bearing ring until, by the vernier, the azimuth bearing is  $173^{\circ} 42'$ .



Reading azimuth bearing by 30 minute vernier used on instruments graduated to  $\frac{1}{2}$  degree. Correct reading  $173^{\circ} 42'$ . Rule: Use arrow (zero line) of vernier as indicator and read value of last division to right of azimuth circle ( $173^{\circ} 30'$ ). Note value of mark on vernier scale which matches on any line of the azimuth circle ( $12'$ ) and add ( $173^{\circ} 30' + 12' = 173^{\circ} 42'$ ).

Leaving the vernier on this setting and without touching the sight bearing ring, loosen the clamp screws. Revolve the entire top plate of instrument until the line of sight cuts the designated target.

Clamp top plate in this position by tightening the screws. Then check both sight alignment and azimuth reading. If both are correct the instrument is accurately oriented. With a rigid stand and reasonable care, the fire finder should remain accurate. Regardless, the orientation and level adjustment of any instrument should be checked daily.

## Instruction 3782h

In cases where accurate orientation information is not available, a fairly accurate meridian can be determined by observing the North Star, as follows:

Ascertain from Ephemeris or otherwise the exact local time at which the North Star will reach point of culmination on its eastern or western swing. Determine what its departure from true north will be at that time. Given this information:

String a long hair from front to rear sight of Fire Finder by means of the small holes provided at top center of sights. This will lie in a vertical plane with front hair and rear slot of sights and permits obtaining the necessary vertical alignment.

Set the vernier on the departure above mentioned and loosen top plate of instrument by releasing clamps.

At the exact local time specified revolve the entire top plate of instrument until line of sight cuts the North Star. Then clamp upper plate in this position.

#### OPERATION

The Fire Finder measures angles to smokes in a manner similar to making compass readings. These angles are known as horizontal angles and vertical angles. The horizontal angle is called the azimuth and is measured from the north in a clockwise direction. The azimuth circle is graduated into 360 degrees with true north indicated by 0. The horizontal angle, or azimuth, is more important than the vertical angle in cases where two or more lookouts can see the fire. Vertical angle readings are helpful where only one lookout is involved. Azimuths are read from the graduation around the Fire Finder. Vertical angles are read from the scale on the rear sight.

You will notice that the azimuth circle is marked with degrees and fractions of degrees. 0 is on the south side of the rim. This has been done for convenience in reading the azimuth. If the figures were placed in their true positions, you would have to go around to the opposite side in order to take the reading.

When a fire is spotted, turn the sight bearing ring by the handle. Your eye should be within 2 inches of rear sight. Line up the vertical hair of front sight and the slot in back sight so that the vertical hair appears in the center of the fire. If too dark to see vertical hair, move night sight shutter into position and use V-notch in shutter in place of vertical hair. Readings can now be made (Slide Fire Finder on tracks or move to other set of tracks to give clear line of sight around obstructions such as corners of buildings, stovepipe, window frame.)

The vernier is attached to the sight ring and is used to read the azimuth in degrees and minutes. Looking at the azimuth graduation in the preceding illustration, you will find that 0 rests between  $173^{\circ} 30'$  and  $174^{\circ}$ . In order to find how many minutes past  $173^{\circ} 30'$  the marker lies, run eyes toward the left until you see a line on the vernier coinciding with a line on the azimuth graduation. Note that the line on the vernier that does coincide with a line on azimuth graduation is 12. The vernier is graduated in minutes, so add 12 minutes to  $173^{\circ} 30'$  to get  $173^{\circ} 42'$ .

Measure the vertical angle from the lookout station to the fire by sighting through peep sight. If the fire is below level of the lookout, slide the peep sight up or down until the lower horizontal hair cuts the fire. The minus or dip angle is then read from a scale on the right side of the slot. If the fire is above the level of lookout point, proceed in the same manner, but use the upper horizontal hair and read from the scale on the left side of slot. A small scratch on sliding peep sight serves as an index point for reading the vertical angle scale which is graduated to 10 minute divisions but can easily read 1 or 2 minutes by interpolation.

Determine the map location of the fire. To do this make sure that the sights are trained on the fire. Then leaving the sights in this position, look straight down on the steel tape which is stretched across center of instrument. This appears as a hair line and will define on the instrument map the exact line along which sights are trained. Thus the platted position of the fire must be somewhere on this defined line. By studying the topography along line of sight it will be observed that the fire is beyond certain known streams and ridges and that other streams and ridges lie beyond the fire. Since these streams and ridges are also shown on the map, the observer can usually determine very closely where on the defined line of sight the fire should be platted. Mark this point on the map with a pencil.

Measure distance to fire. This distance in inches from lookout station to pencil mark or mapped location of fire is simply read off from graduations on the bisecting steel tape and converted to miles in accordance with the scale of the map used. The scale on the tape is in inches, thus on a  $\frac{1}{2}$  inch scale map a fire measured 3 inches from the lookout (on the map) is .6 miles from the lookout (on the ground).

Leupold & Stevens, Inc.  
PO Box 688  
Beaverton, Oregon 97005  
U.S.A.

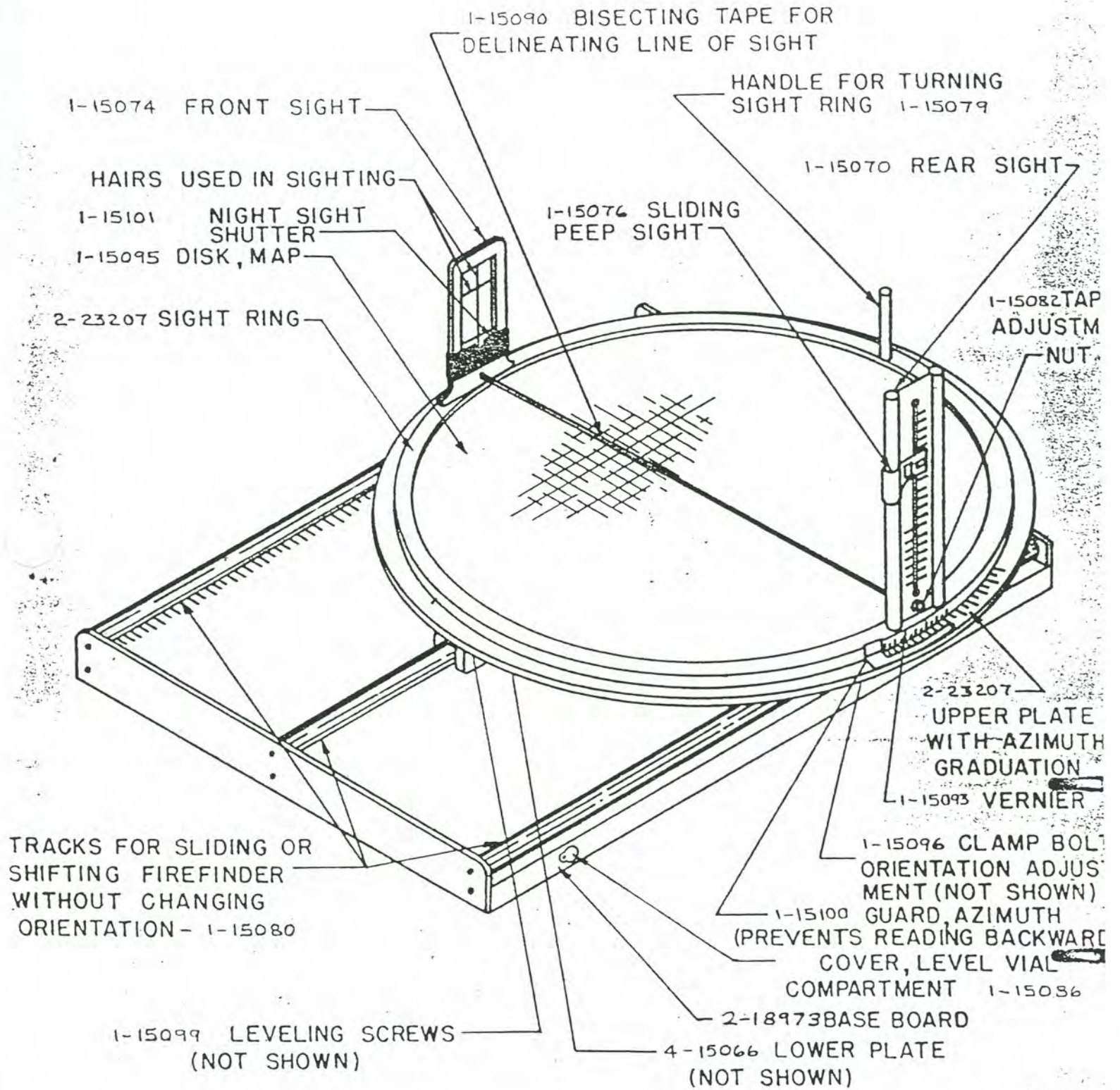
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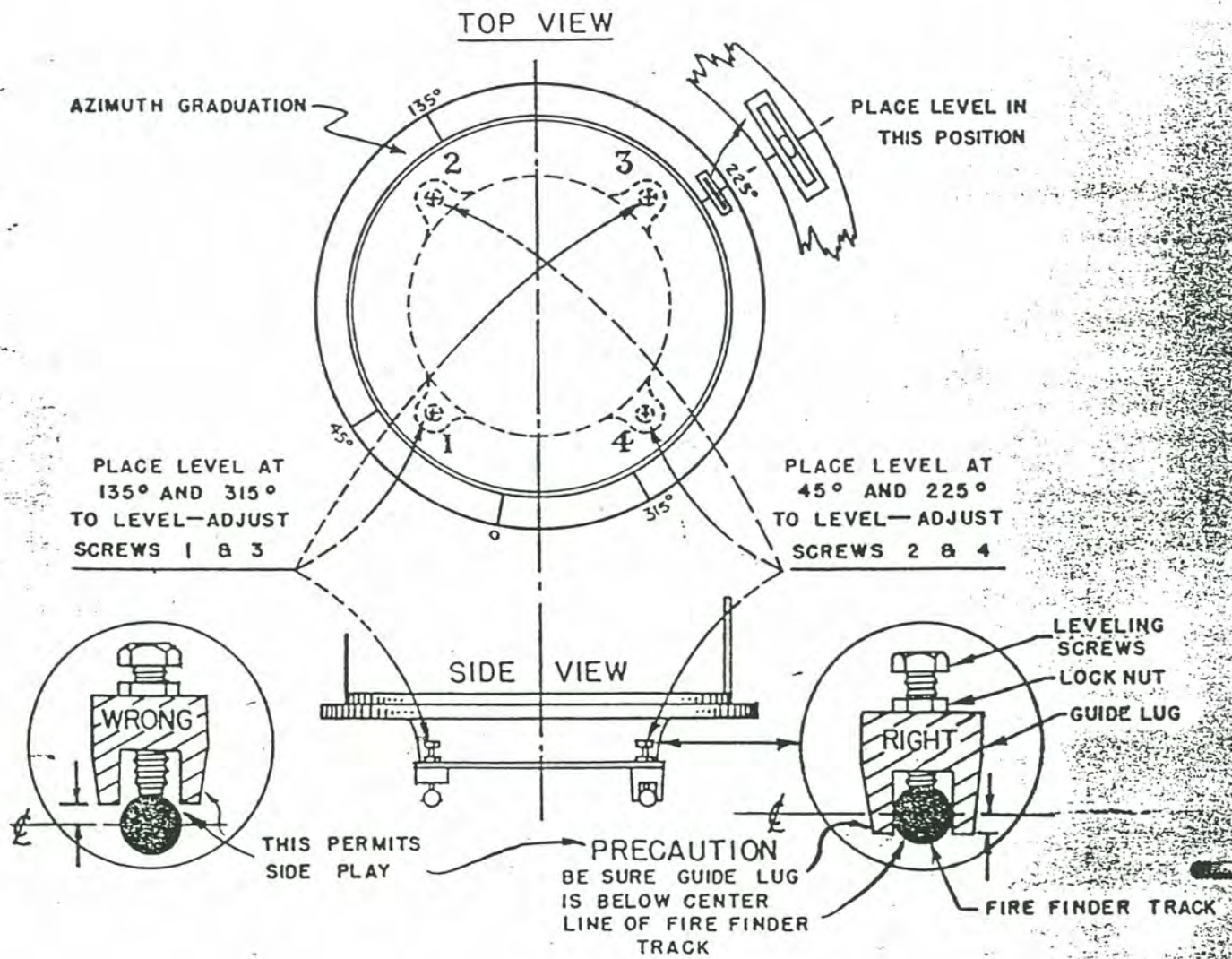
Portions of these instructions taken from U.S. Department of Agriculture, Forest Service, "Fireman's Guide" and "The Western Fire Fighter's Manual, Chapter V, The Lookout System" published by the Western Forestry and Conservation Association, Seattle, Washing

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LEVELING THE FIREFINDER