WEAVER®

Safety Lane

Ray O Scope
Headlight Tester Manual

Model Year 1940

DISCONTINUED No Parts Are Available

First Rayoscope Model – Later Redesigned with a vertical profile

Visit www.castleequipment .com and view the Weaver History Page for additional details

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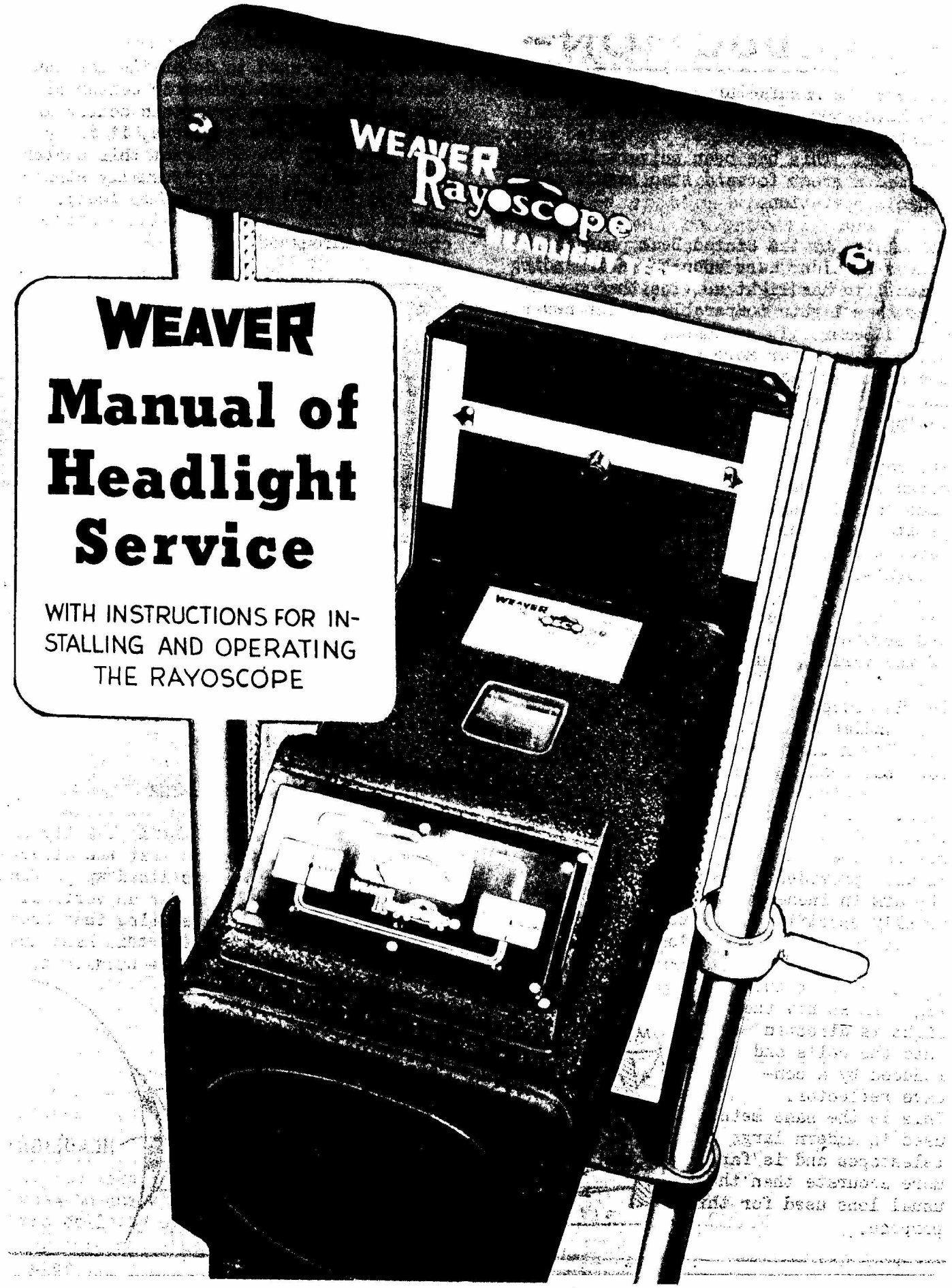


WEAVER
Manual of Headlight Service

WITH INSTRUCTIONS FOR INSTALLING AND OPERATING THE RAYOSCOPE

-INTRODUCTION-

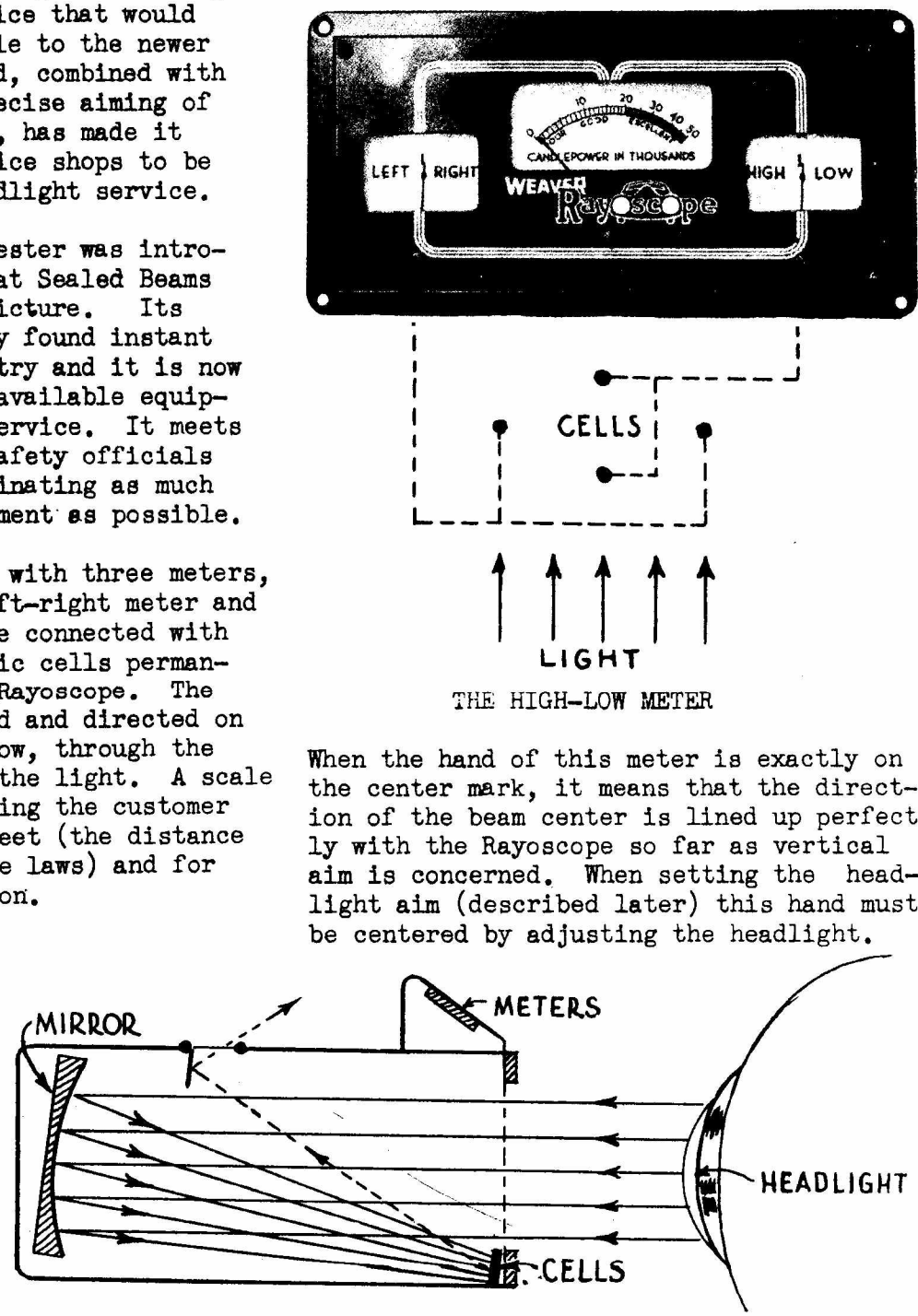
In 1939 the manufacturers of automobiles and headlamps, cooperating with national safety groups, introduced the Sealed Beam headlamp. This has been universally acclaimed a great forward step toward safer vehicle operation.

Stimulated by the Sealed Beam program, owners of older cars soon began demanding scientific headlight service that would give them lights comparable to the newer Sealed Beams. This demand, combined with the necessity for more precise aiming of the stronger Sealed Beams, has made it necessary for modern service shops to be equipped for complete headlight service.

The Rayoscope Headlight Tester was introduced at the same time that Sealed Beams came into the headlight picture. Its greater speed and accuracy found instant favor throughout the country and it is now recognized as the finest available equipment for this important service. It meets all the requirements of safety officials and service shops by eliminating as much of the variable human element as possible.

The Rayoscope is equipped with three meters, the candlepower meter, left-right meter and high-low meter. These are connected with four balanced photoelectric cells permanently mounted within the Rayoscope. The light beam is concentrated and directed on these cells which then show, through the meters, the condition of the light. A scale is also provided for showing the customer the aim in inches at 25 feet (the distance usually specified in state laws) and for use in the aiming operation.

The diagram at the right shows how the light is directed onto the cells and reduced by a concave reflector. This is the same method used in modern large telescopes and is far more accurate than the usual lens used for this purpose.



THE CANDLEPOWER METER

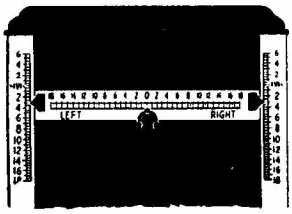
This meter is used to determine the beam candlepower of the geometric center of the beam. Once the geometric center is located by the aiming meters, it is the operator's job to direct this center to a pre-determined mark (usually straight ahead with a 3-inch drop at 25 feet). The action of this center meter hand should be observed throughout the tests.

THE HIGH-LOW METER

When the hand of this meter is exactly on the center mark, it means that the direction of the beam center is lined up perfectly with the Rayoscope so far as vertical aim is concerned. When setting the headlight aim (described later) this hand must be centered by adjusting the headlight.

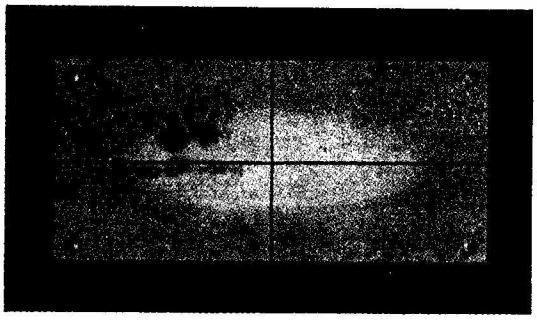
THE LEFT-RIGHT METER

This meter shows the same things as the high-low meter except that, as its name implies, it applies only to the horizontal aim of the light.



THE AIMING SCALE (above)

This scale is located on the back panel and shows both vertical and lateral aim in inches at 25 feet. It is used throughout the testing operation (described later) but is also a valuable sales aid. It has been placed on the Rayoscope so that it may be easily seen from the driver's seat of the car (as have the meters) and may be used to convince customers that lights need adjustment.



THE FILTER PLATE (above)

In order to prevent the full intensity of the concentrated beam pattern from falling directly onto the photoelectric cells, a heavy, translucent filter plate is superimposed on them. This plate also reproduces the beam pattern in miniature and is visible through the window in the top of the Rayoscope. It is used for aiming adverse weather lamps which, unlike headlights, are aimed from the top of the beam. This filter plate should not be used for final aim of headlights because of the likelihood of error, but it may be used to quickly place the beam pattern on the cells by eye before making the final accurate adjustments by means of the aiming meters.

—INSTALLING THE— Rayoscope

1 - First locate a spot in your service station where headlight service can be properly and quickly done. It should be easy for the customers to drive their cars to the spot on your floor you have picked for this important service. Secondly, be sure that the floor area is flat. This area need not be perfectly level, but it must be in the same plane.For example, in Fig. 1,areas A and B are not level, but are in the same plane.Finally locate the tester so there is no danger of cars striking it.

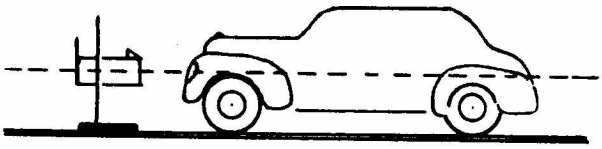
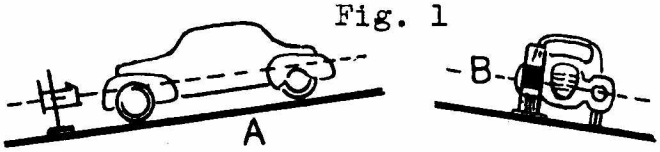


Fig. 1



2 - Next place the Rayoscope tracks on the floor approximately at right angles to the direction from which cars will drive up to the tester. The two tracks must be parallel, that is, exactly the same distance apart.A wooden spacer, Fig. 2,is provided for this. This spacer should be placed a - cross the two tracks at both ends, the upper rails of the tracks fitting into the notches of the wooden spacer.By testing the tracks in

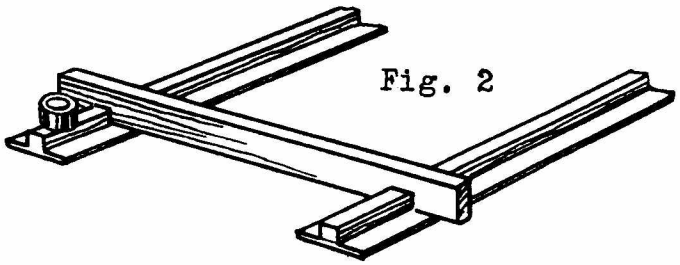


Fig. 2

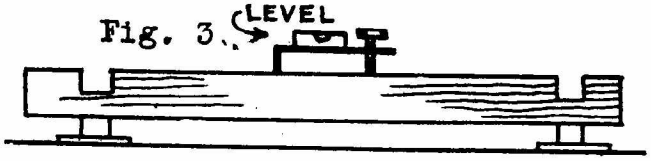
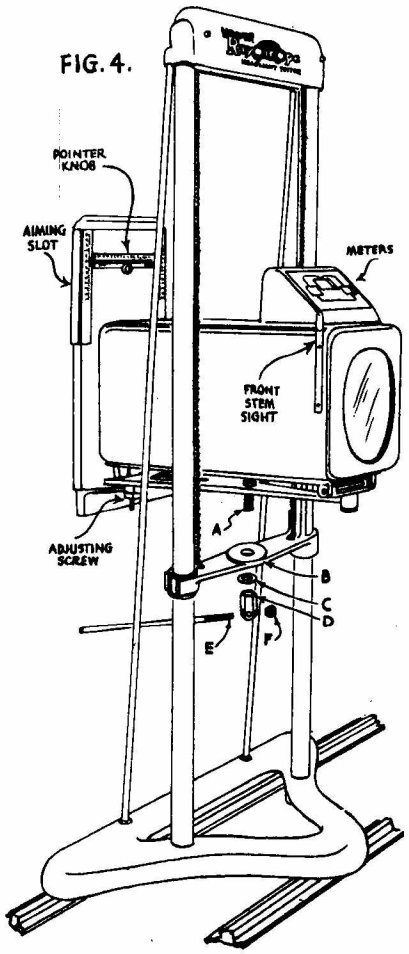


Fig. 3

this way at several points they can be located exactly parallel. Tracks which are to be anchored to the floor should be tested with the spirit level to make sure both tracks are in the same plane: Place the wooden track spacer near one end of track as in Fig. 3. Place spirit level on the spacer and adjust until bubble shows "level". Without changing this adjustment, place the spacer and level at intervals of a foot or so along the track and check. If the bubble remains at "level" at each point of test, the tracks are in the same plane. But if the bubble shifts from "level" at any point of test, the track must be shimmed, using metal shims. One track has holes drilled in each end. Place this one farthest from the car. Both tracks may now be fastened to the floor with lag screws. Attach rubber bumpers to track with holes provided in the ends. These keep Rayoscope from running off ends of tracks.

FIG. 4.



ASSEMBLING THE RAYOSCOPE

Place bolt (A) through hole in center of base support (B). Place washer (C) on bolt and turn locking nut (D) until finger tight. Screw locking lever (E) into holes at bottom of locking nut so, when tightened, the lever will extend toward rear of Tester. Screw acorn nut (F) on end of locking lever.

Permanently installed tracks require channels to be cut in the floor and levelling should be done with concrete, using the spirit level for getting the tracks in the same plane.

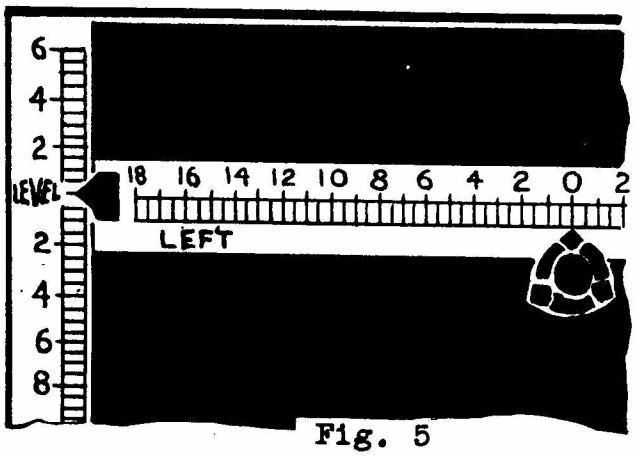


Fig. 5

3. Assemble the Rayoscope as shown in Fig. 4, and mount it on the tracks. Grasp the pointer knob of the rear aiming scale and set the vertical aim scale so it reads on the "LEVEL" mark, Fig. 5.

CALIBRATION

The Rayoscope must be installed so that the track is in the same plane as the floor on which the car rests. If the floor slants the tracks of the Rayoscope should also slant. This can be done by shimming the track. The following instructions are for calibrating the Rayoscope to the floor.

4. Move the Rayoscope near one end of the track in line with either the right or left pair of car wheels.

Place the Calibrating Stand directly in front of the Rayoscope with the steel Calibrating Target pointing directly at the glass in the front of the Rayoscope (A)

Raise or lower the Rayoscope until the point of the Calibrating Target coincides with the horizontal cross line on the front glass of the Rayoscope (A)

5. Now place the Calibrating Stand at about the position to be occupied by the rear wheel of the car. This will be about 12 feet from the track. Turn the Calibrating Stand so that the Target (steel pointer) is approximately parallel to the track.

6. The next step is to aim through the Aiming Slot at the back of the Rayoscope, and over the Front Stem Sight fastened to the side of the Rayoscope, at the Calibrating Target on the Stand. Adjust the Rayoscope till the sights are in line with the vertical white line on the target.

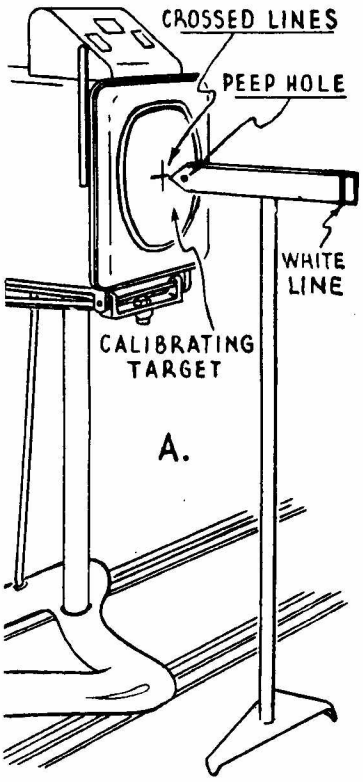
7. Direct the beam of a flashlight or hanging light bulb into the small window in the top of the Rayoscope (C). Watch in the front of the Rayoscope to make sure this light illuminates the Filter Screen with the crossed lines.

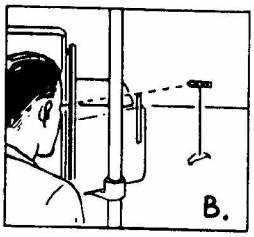
8. Look through the Peep Hole in the Calibrating Stand at the crossed lines on the front glass of the Rayoscope and the crossed lines on the illuminated Filter Screen. The object now is to make the two sets of crossed lines and the center of the Peep Hole line up (D). Set the Aiming Scale at the back of the Rayoscope at "LEVEL" and "0".

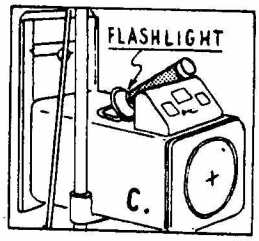
9. Find the Adjusting Screw at the rear and under the Rayoscope and have an assistant with a screwdriver adjust with this screw while you watch through the Peep Hole. When both sets of crossed lines do not line up the TRACK should be shimmed until they do. Do not change the adjustment of the Rayoscope.

10. Move the Rayoscope to the opposite end of the track and repeat the sighting procedure. If the crossed lines do not line up the TRACK should be shimmed until they do. Do not change the adjustment of the Rayoscope.

Keep the Calibrating Stand in a handy place so the Rayoscope can be re-calibrated from time to time to insure precision in testing headlights.







OPERATING THE RAYOSCOPE

1. Drive the car to be tested up to the Rayoscope so that the headlight lenses are about 12 inches or so from the front of the Rayoscope box. The tester can be used at a distance of 3 or 4 feet from the headlights but at these distances the candlepower meter reading drops about 5 or 10 percent. For this reason it is recommended that all testing be done with the headlight lens from 1 to 24 inches from the front of the Rayoscope box.

2. Before testing or adjusting the headlights always rock the car to relieve the spring tension. Inflate the tires to proper pressures. Do not lean on the fenders while making adjustments. Lights should be adjusted with the car not loaded. The Weaver Rayoscope is a sensitive and accurate instrument and for this reason the fore-

going points must be observed. The least change in the position of the car which will also change the position of the lights will register on the meters of the Rayoscope.

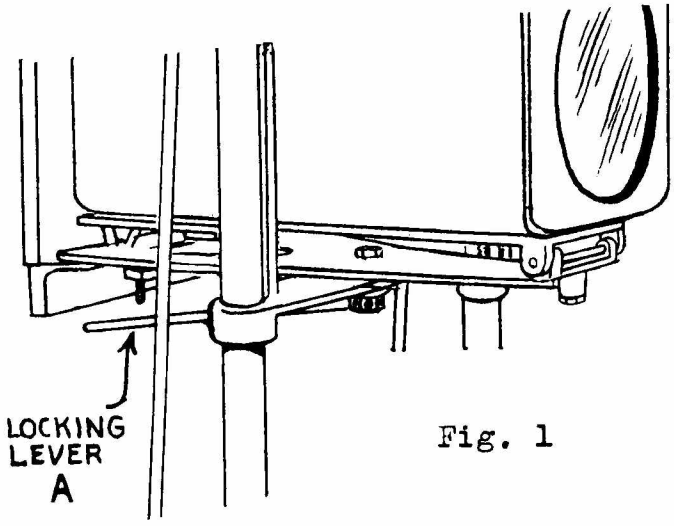


Fig. 1

3. Move the Rayoscope along the track until it is directly in front of the center of the car. Release the lock lever, A, Fig. 1. Now sight through the vertical aiming slot on the right side of the back panel as you face the car, Fig. 2. Stand at the rear of the Rayoscope and sight through the slot across the vertical stem sight on the right front of the box and along the center line of the car's hood. This lines up the sights with the hood. Next lock the tester in this position by moving the lock lever, A, Fig. 1, to the right.

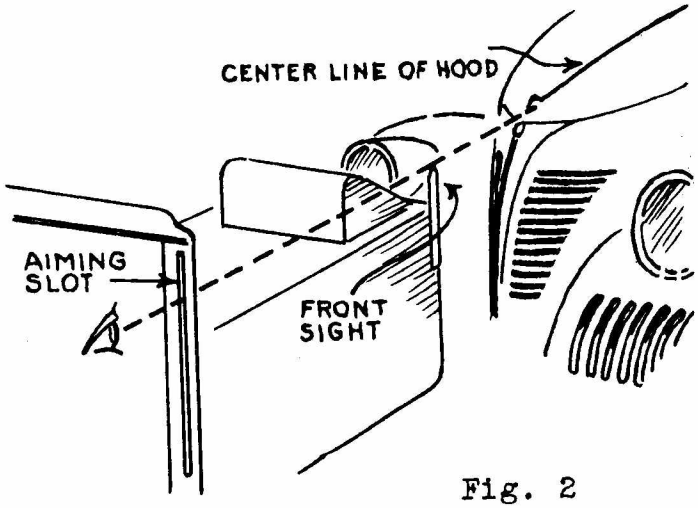


Fig. 2

4. Move the Rayoscope along the track until it is directly in front of one of the headlights. Adjust the tester to the proper height by sliding it up and down and watching the candlepower meter. At the point where you get the highest reading, lock the tester in place by means of the handle on the left-hand vertical sliding member.

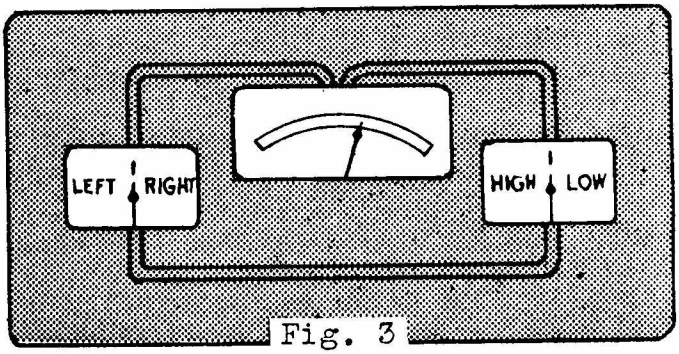


Fig. 3

5. With the headlights on the high or driving beam, note the position of the meter hands on both aiming meters. One meter shows "high-low" and the other "left-right". Next move the pointer knob on the back scale until the hands on both aiming meters are on the center mark, Fig. 3. For example, if the aiming meters read "right" and "low" simply move the knob to the right and down - wards. Then read the back scale. This shows the horizontal and vertical aim of the headlight in inches at 25 feet. The knob indicates the side aim while the two pointers on the sides indicate the high-low aim of the light beam. For instance, in Fig. 4, the light would be aimed 4 inches low in 25 feet and 6 inches to the right.

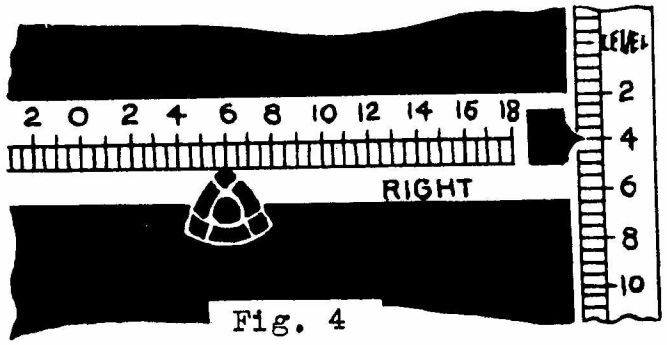


Fig. 4

6. Set the knob on the back panel so the vertical scale indicates the legal drop in inches at a distance of 25 feet. (The standard aim recognized in nearly all states is a 3 inch drop in 25 feet. This is marked in red on the Rayoscope gauge). Now move the knob sidewise on gauge so the horizontal scale shows the proper lateral or side aim for the type of light with which the car is equipped. (See table on page 22 for proper aim of all lights).

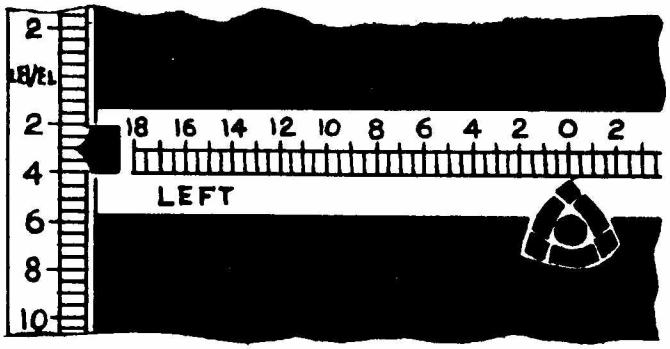


Fig. 5

7. Now read the aiming meters. One of the meters will show if the light is high or low and the other meter whether the light is aimed to the right or left. For example, with the aiming scale set to the requirements as shown in Fig. 5, that is, the light to be pointed straight ahead and the light beam dropped 3 inches in 25 feet, if the meters show light to be pointed as in Fig. 6, corrections must be made by moving the headlights to the right and lowering them until the meter hands indicate as in Fig. 7.

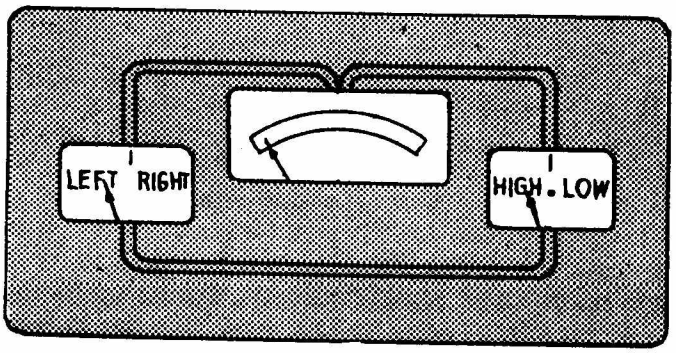


Fig. 6

8. With lights adjusted so hands of both aiming meters are on the center line, they will be correctly aimed and have the correct candlepower reading.

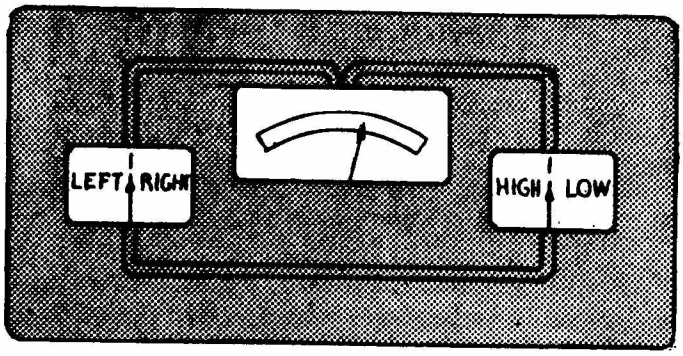


Fig. 7

ASYMMETRIC HEADLIGHTS.

Asymmetric headlights always have lenses marked "RIGHT" and "LEFT", since they are not interchangeable and must be used on the side where they belong. Only one beam changes, the other remaining in the same position for both driving and passing.

CROSSED WIRING

Occasionally you may find, by watching the beam patterns on a suitable screen or wall and pressing the foot switch, that one beam goes up and the other goes down. Pressing the switch a second time causes the beams to reverse. This indicates that the wires leading to one of the headlights have been crossed.

To correct this, the wires leading to the bulb socket in one headlight should be interchanged. This will make both lights raise and lower together as they should. This applies to ordinary dual beam headlights, not to multi-beam types.