SECTION 10-H

SIGNAL SYSTEMS

CONTENTS OF SECTION 10-H

SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

10-58 STOP LIGHTS AND SWITCH

The stop lights are incorporated in the combination tail, stop, and direction signal lamps. These lamps and the replacement of bulbs are covered in paragraph 10-56.

The stop lights are controlled by a hydraulic switch mounted on the brake pipe distributor fitting near the master cylinder. The switch is closed by hydraulic pressure when the brakes are applied. It requires no adjustment or attention except to make sure that the wire connections are tight and that the switch is tightly screwed into the distributor fitting to avoid fluid leaks that would affect operation of the brakes.

On *1948 Models,* the stop lights are independent of the lighting switch but are protected by the thermo circuit breaker on the lighting switch. On *1949 Series 50-70,* the stop lights are not protected by the circuit breaker but are protected by the same fuse that protects the direction signal light circuit. This fuse is located on the fuse block under the cowl.

a. Replacement of Stop Light Switch

When replacing stop light switch have new switch ready to install as soon as old switch is removed from distributor fitting. Before installing new switch make sure that port in distributor fitting is filled with brake fluid. Have a helper *gently* depress brake pedal to fill the fitting from master cylinder, if necessary, then immediately install new switch.

If brake pedal has springy, spongy action after installation of stop light switch, air has entered brake pipes and it will be necessary to bleed the hydraulic system (par. 8-9).

10-59 HORNS, RELAY AND BUTTON

Two Delco-Remy electrically operated vibrator type horns are mounted on the dash under the hood. Both horns are operated simultaneously by a horn relay mounted on the dash, and the relay is controlled by a horn button mounted on the steering wheel.

The left hand horn is high pitched (380-400 cycles) and the right hand horn is low pitched (302-323 cycles), so that together they produce a pleasing blended tone. The horns have been made exceptionally compact by a spiral air column cast into the base and collar. See figure 10-111.

The horn relay is an electrical switch which closes the circuit between the battery and the horns when the horn button is pressed, and opens the circuit when the button is released. The relay permits control of the horns with a small amount of current passing through the horn button contacts. The high current required by the horns would cause arcing and burning of these contacts.

When the horn button contacts are closed, a small amount of current flows through the

relay winding to ground at the horn button. This magnetizes the relay core, which attracts the flat steel relay armature. The armature has a contact point which makes contact with a stationary point to close the horn circuit. When horn button is released, current stops flowing through relay winding so that the core loses its magnetism; the armature spring then causes contact points to be separated.

the monogram and bezel assembly are removed, the operating ring and wheel base assembly may be removed by removing the three screws which attach the wheel base to the steering wheel hub. See figure 10-111.

The horn button assembly used in the solid spoke wheel consists of a button, contact, rubber separator and lock ring. A spring holds the wire connection against the center of the con-

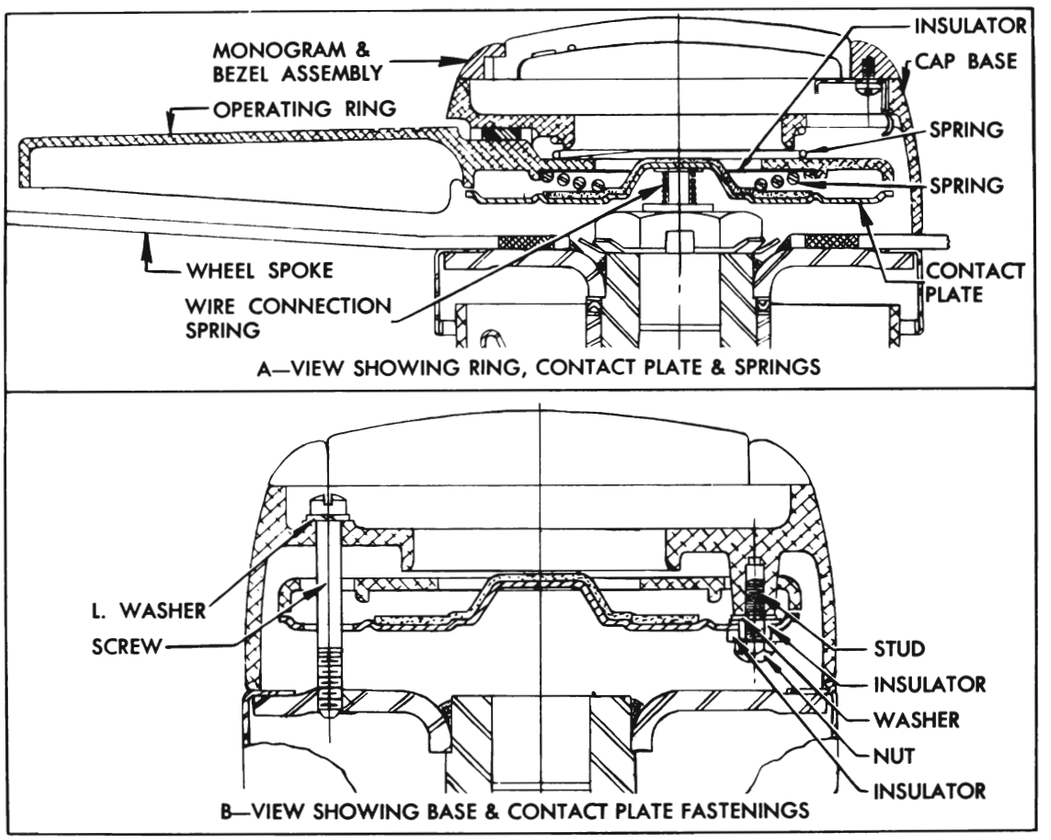

Figure 10-111—Horn Button in Flexible Spoke Steering Wheel—Sectional View

The horn button used with the flexible spoke steering wheel includes an operating ring and a contact plate mounted in the steering wheel cap base. A spring holds the wire connection against the center of the contact plate which is insulated from the wheel cap base. When the operating ring is pressed it touches the contact plate to close the circuit to ground, thus completing the relay circuit and causing the horns to operate. Springs cause the operating ring to move away from the contact plate and open the relay circuit when the operating ring is released. See figure 10-111.

The monogram and bezel assembly is held in the steering wheel cap base by three springs. The assembly may be removed by inserting a small screw driver in a notch provided in the cap base and prying against the bezel. When

tact plate at all times. Contact to ground is made between the outer edge of the contact plate and lock ring, thus completing the circuit when button is pressed. See figure 10-112.

The horn button may be removed by prying on the outer edge of the button with a small screwdriver.

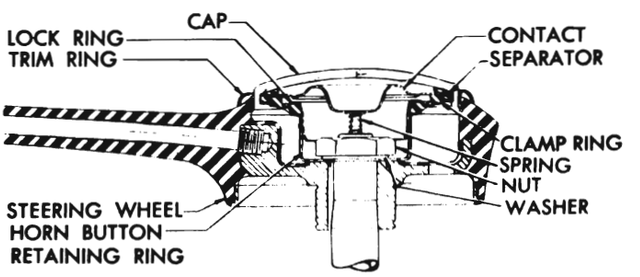

Figure 10-112—Horn Button in Solid Spoke Steering Wheel—Sectional View

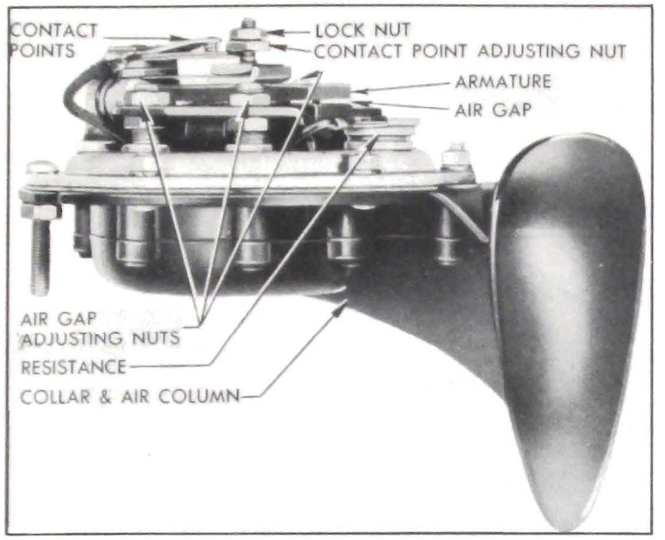

Figure 10-113—Horn—Adjustments

10-60 ADJUSTMENT OF HORNS

When horns fail to blow, or tone is of poor quality, two adjustments are required: armature air gap, and contact points. The air gap adjustment is very important and should always be checked before making adjustment of contact points.

In order to insure proper tone quality of each horn and a properly blended tone when both horns are sounded together, it is necessary to adjust contact points to a specified current draw at 6 volts, using a voltmeter and ammeter.

1. Disconnect wire from one horn while adjusting the other horn.

2. Remove back shell and bracket. See figure 10-113. Using feeler gauges, check the air gap and adjust by means of the three adjusting nuts, if necessary, to obtain a uniform gap across the entire surface of armature, as follows:

Left (high note) horn.... .035" to .039"

Right (low note) horn.... .045" to .049"

3. Connect positive lead of ammeter to horn terminal and negative lead to battery terminal on cranking motor solenoid switch. See figure 10-114. NOTE: *Ammeter leads must be at least #10 gauge wire to avoid excessive voltage drop.*

4. Connect positive lead of voltmeter to horn terminal and negative lead to ground on horn collar. See figure 10-114.

5. With engine running, regulate charging current by varying engine speed until voltmeter registers 6 volts, while horn is blowing. Horn may be muffled by stuffing a wadded cloth into mouth of air column.

6. When voltmeter registers 6 volts, note ammeter reading which should be as follows for correct contact point adjustment:

Left (high note) horn..17 to 19 Amperes

Right (low note) horn..19 to 21 Amperes

7. Adjust to specified current draw, if necessary, by loosening lock nut and turning contact point adjusting nut (fig. 10-113) clockwise to decrease or counterclockwise to increase amperage. This adjustment is very sensitive, and adjusting nut should not be moved more than one-tenth turn at a time, then locked with nut each time before trying the horn. Increasing the current draw increases the horn volume; however, too much current will cause the horn to have a sputtering sound, and may cause the horn to lock in cold weather.

8. After each horn has been adjusted individually, sound both horns together to check for proper blend of tone.

10-61 ADJUSTMENT OF HORN RELAY

Three checks and adjustments are required on the horn relay: air gap, point opening, and closing voltage. These should be made in the following order:

1. Remove horn relay from car then remove relay cover.

2. Push relay armature down until contact points just touch, then check air gap between armature and end of core using feeler gauges. Air gap should be .015". Adjust gap to .015", if necessary, by bending the lower point support. See figure 10-114.

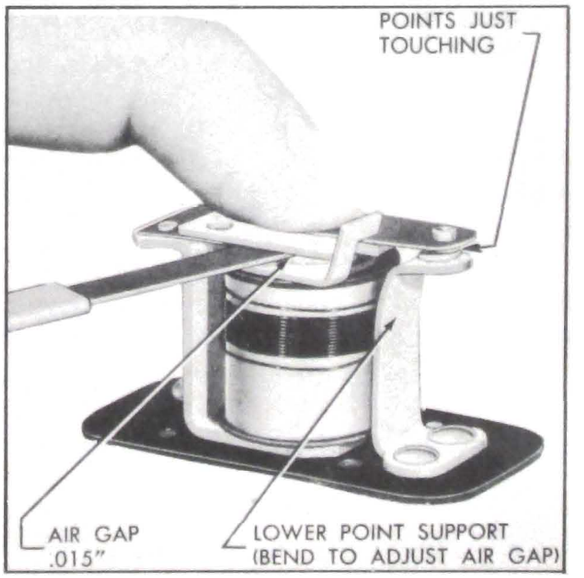

Figure 10-114—Horn Relay Air Gap Adjustment

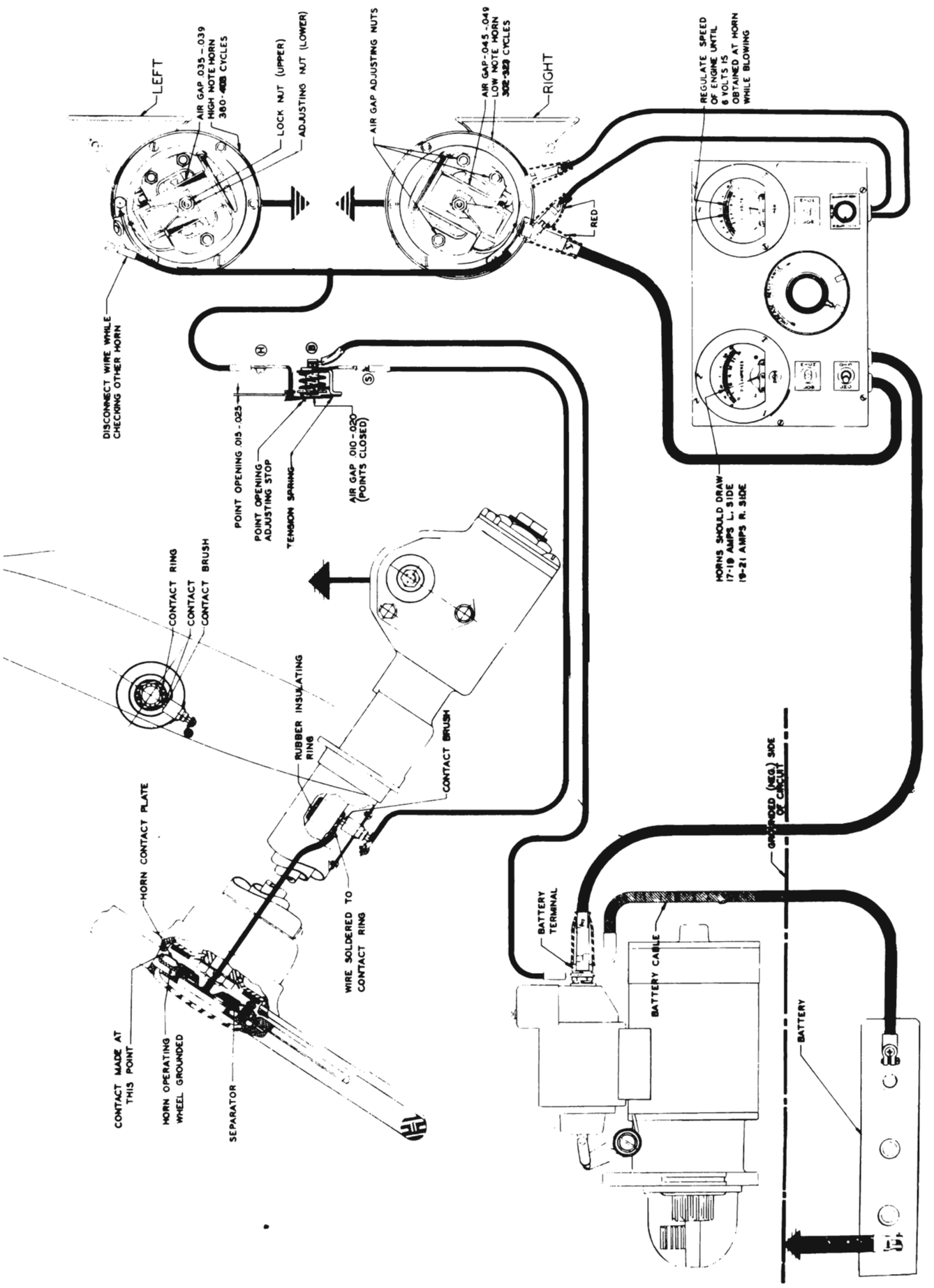

Figure 10-115—Connections for Adjusting Horn Contact Points

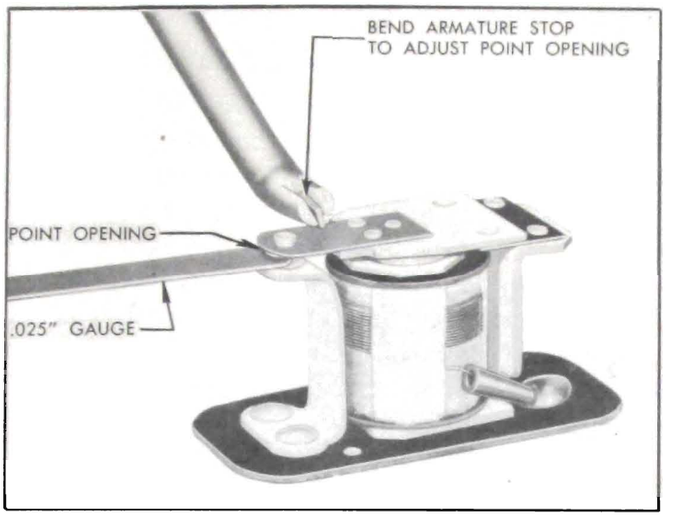

Figure 10-116—Relay Contact Point Adjustment

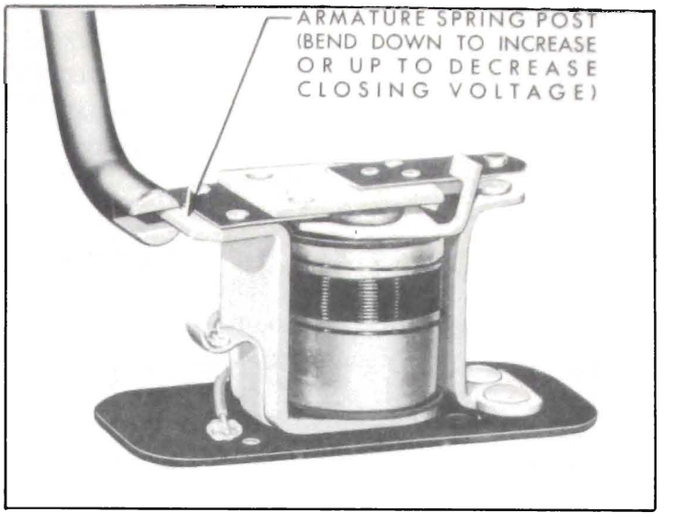

Figure 10-117—Adjustment of Horn Relay Closing Voltage

3. With armature free, check contact point opening, using feeler gauges. Point opening should be .025". Adjust opening to .025", if necessary, by bending the upper armature stop. See figure 10-116.

4. Connect the positive terminal of a 6-volt battery to the battery (middle) terminal of horn relay.

5. Using a variable rheostat of 10 ohms minimum and a capacity of 2 amperes, connect one lead to the negative post of battery. Set rheostat to provide full resistance, then connect the other lead to the "S" terminal of relay.

6. Connect a 6-volt test lamp between negative post of battery and the "H" terminal of relay.

7. Connect positive lead of low reading voltmeter to the battery (middle) terminal of horn relay and connect negative lead of voltmeter to the "S" terminal of relay.

8. Slowly decrease resistance until the test lamp lights, note the voltmeter reading, then turn rheostat to full resistance. Closing voltage should be 2.75 to 4 volts.

9. If closing voltage is not within specified limits, bend the armature spring post as required. Bend down to increase closing voltage or bend up to decrease closing voltage. See figure 10-117.

10. After proper closing voltage is obtained, install relay cover. Install relay on car and connect wires as shown in wiring circuit diagram in Section 10-J.

10-62 DIRECTION SIGNAL LAMPS AND SWITCH

a. Direction Signal Lamps and Indicators

The direction signal lamps are incorporated in the front parking lamps and the rear combination tail, stop and signal lamps. In *1948 models*, the rear lamps are provided with separate signal light bulbs which operate independently of the tail and stop light bulbs. In *1949 Series 50-70*, one 21-3 CP bulb is used in each lamp; the 3 CP filament provides the tail light and the 21 CP filament provides both the stop light and the signal light.

When the ignition switch is turned on and the direction signal switch is manually operated to indicate a turn, the front and rear signal lights flash on and off on the side of car for which a turn is indicated. The flashing of signal lights is caused by a Tungsol flasher which is connected into the proper signal light circuit by contacts made in the direction signal switch when switch is set for a turn.

If the brakes are applied at the same time the signal switch is set for a turn, two separate stop lights will burn steadily on the *1948 models*. On *1949 Series 50-70* however, the 21 CP lamp filament will flash on side for which turn is indicated while the opposite 21 CP lamp filament will burn steadily to provide the stop light.

When the direction signal lights are flashing, a signal indicator bulb on instrument panel also flashes, producing a small arrow of green light to indicate the direction for which the signal has been set. For a left turn the green light flashes in the left side of the charge indi-

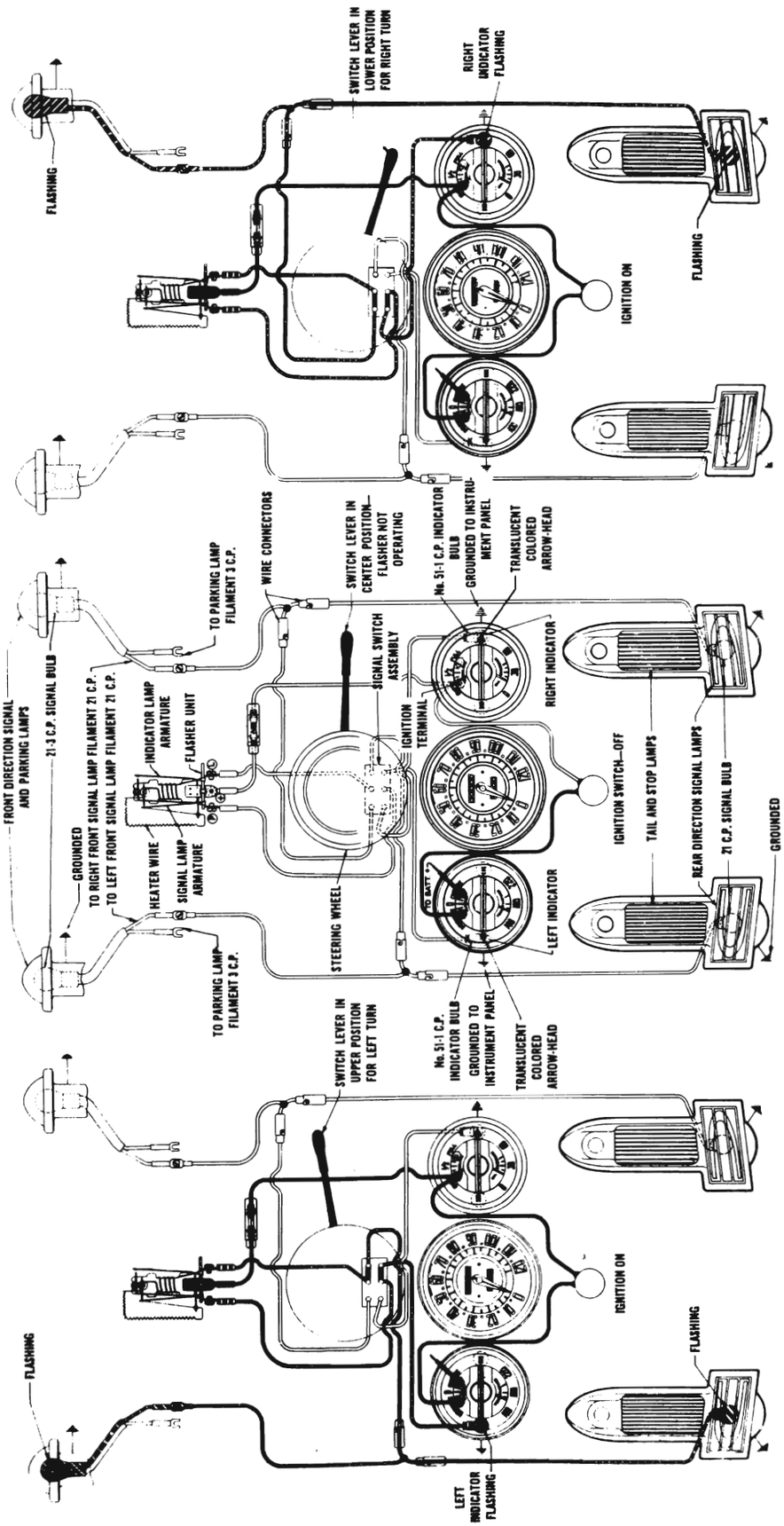

Figure 10-118—Direction Signal Lamp Diagram—1948 Models

cator, and for a right turn the green light flashes in the right side of the gasoline gauge.

b. Direction Signal Switch Operation

The direction signal switch and its operating mechanism is enclosed in a housing on steering column just below steering wheel.

The switch must be manually set by moving switch control lever down to indicate a right turn or moving lever up to indicate a left turn. The switch is automatically returned to "off" position when steering wheel is straightened after completion of a turn. It can be manually returned to "off" position if the turn is not made. If switch is set to indicate a turn in one direction and a turn is made in opposite direction, the switch will be returned to "off" position as the turn is made and will not give a signal for the turn actually made.

The switch is attached to a cover plate mounted in the switch housing. The switch handle, protected by a hardened steel sleeve, extends upward to engage a slotted hole in the lever plate which is mounted in housing on three ball bearings so that it can be rotated by the attached control lever. Rotation of the lever plate moves the switch handle to obtain the "left", "off", or "right" position of switch contacts. The lever plate is held in the selected position by a detent roller on the plate which engages a detent spring mounted in switch housing. See figure 10-123.

When the lever plate is manually rotated for a right (or left) turn by the control lever, the corresponding end of a trigger on lever plate is pressed against a cam on the steering wheel hub by the action of a spring loaded post lever. When the steering wheel is turned approximately one third revolution for a right (or left) turn, the end of the trigger drops into a notch in the cam so that the trigger, lever plate, and switch handle are pushed back to the "off" position as the wheel is turned in the opposite direction after the turn is completed. As the switch reaches the "off" position, the trigger is withdrawn from engagement with the cam by the action of another spring loaded post lever. See figure 10-123. The switch remains in the "off" position until it is again set for a turn.

The cam is a hardened steel ring with two diametrically opposite elongated notches. It is

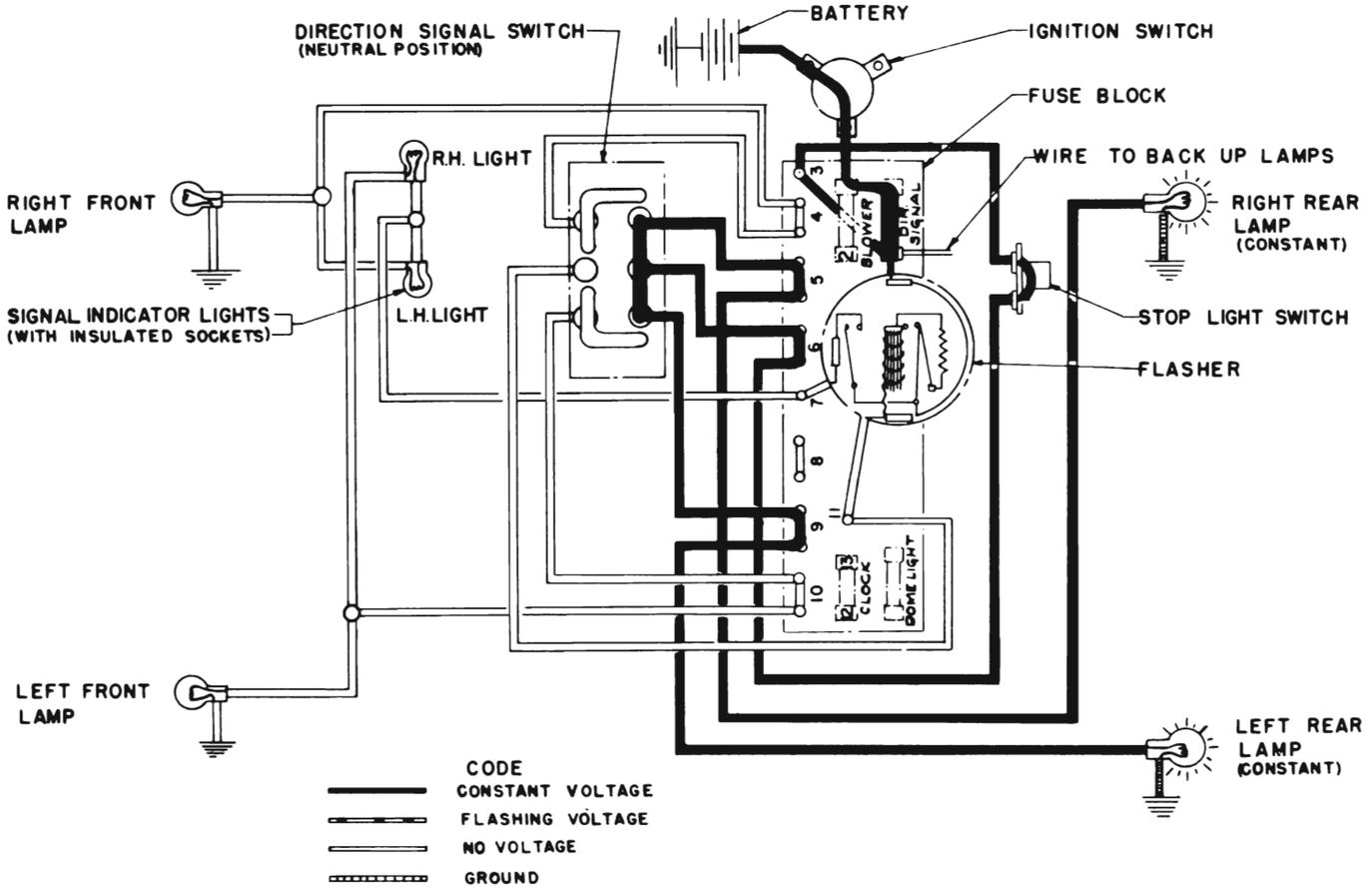

Figure 10-119—Direction Signal and Stop Lamp Circuit Diagram, Stop Light On, No Turn Indicated—1949 Series 50-70

installed on the shouldered hub of steering wheel with three brass washers and a spring washer, all being retained by a snap ring. The brass washers and spring washer form a friction clutch which facilitates shifting of the cam to adjust switch for proper timing, and coincidentally prevents accidental locking or jamming of the steering wheel by the signal switch mechanism.

c. Direction Signal Lamp Circuits

Since the direction signal lights are independent of the headlamp lighting switch and thermo circuit breaker, the wiring circuits are protected by a fuse. On *1948 models*, the fuse is located in a splice type fuse holder clipped to steering column brace under the cowl. On *1949 Series 50-70*, the fuse is located on the fuse block under the cowl.

In *1948 models*, the Tungsol flasher is mounted in the steering column support under the cowl. On *1949 Series 50-70*, the flasher is mounted on the fuse block under the cowl.

The wiring circuits used in *1948 models* and shown in figure 10-116 are entirely different from the wiring circuits used in *1949 Series 50-70* and shown in figure 10-119, 10-120 and 10-121. These differences must be thoroughly understood when diagnosing trouble or performing any work on the wiring.

In *1948 models*, the rear signal lights are independent of the stop light circuit, and the indicator lamp bulb sockets are grounded to instrument panel.

In *1949 Series 50-70*, the rear signal lights are interconnected with the stop lights when brakes are applied at the same time that signal switch is set for a turn. The indicator lamp sockets are insulated from the instrument panel and each indicator lamp is grounded through the *opposite* front direction signal lamp filament. See figures 10-120 and 10-121.

In *1949 Series 50-70*, when the direction signal switch is in the "right turn" position (fig. 10-120), there is an equal flashing voltage available at both sides of the left indicator lamp. Because there is an equal voltage on both sides, current cannot flow and the lamp will not be illuminated. At the same time, this same flashing voltage is available on only one side of the

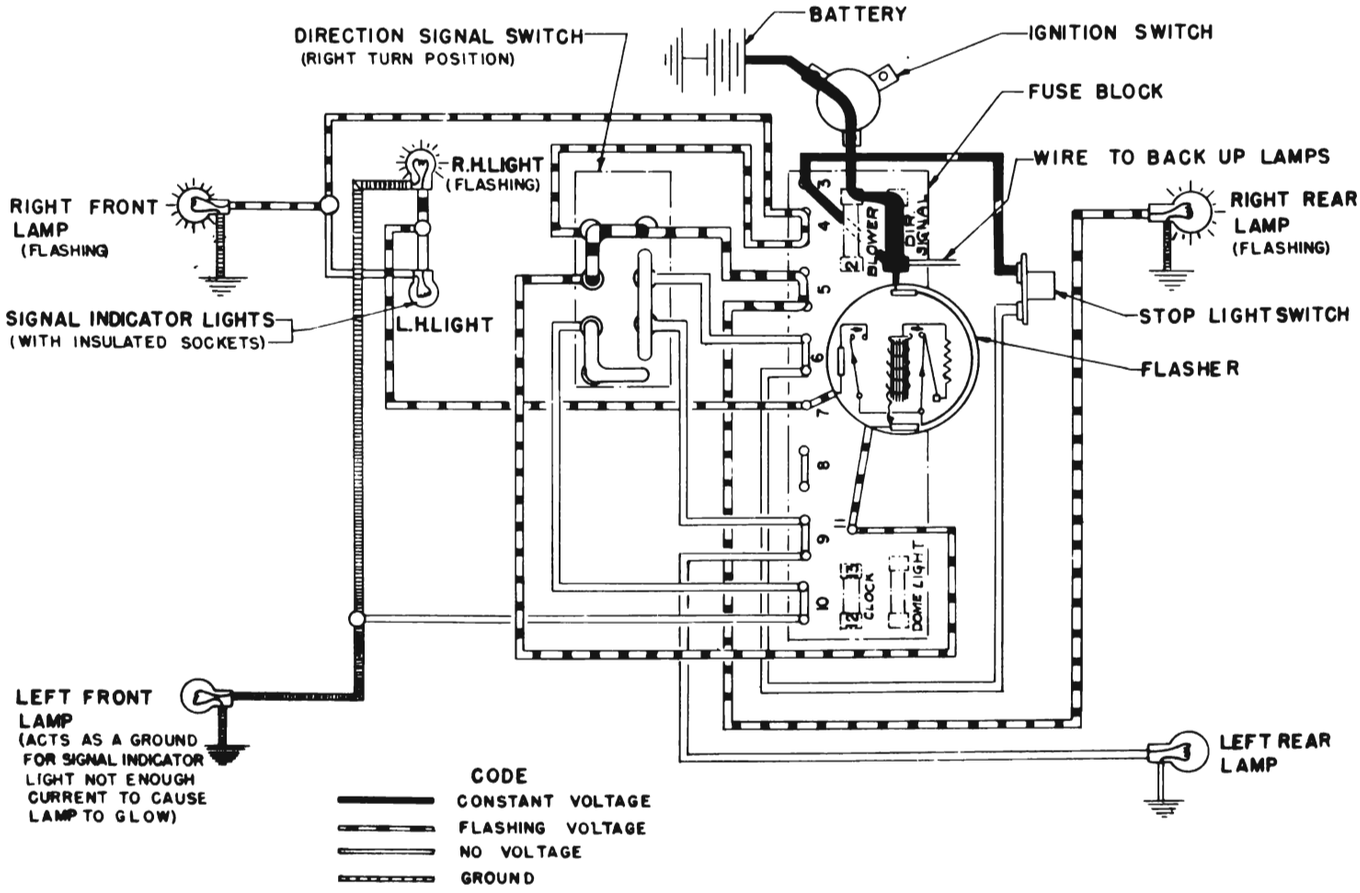

Figure 10-120—Direction Signal and Stop Lamp Circuit Diagram, Stop Light Off, Right Turn Indicated—1949 Series 50-70

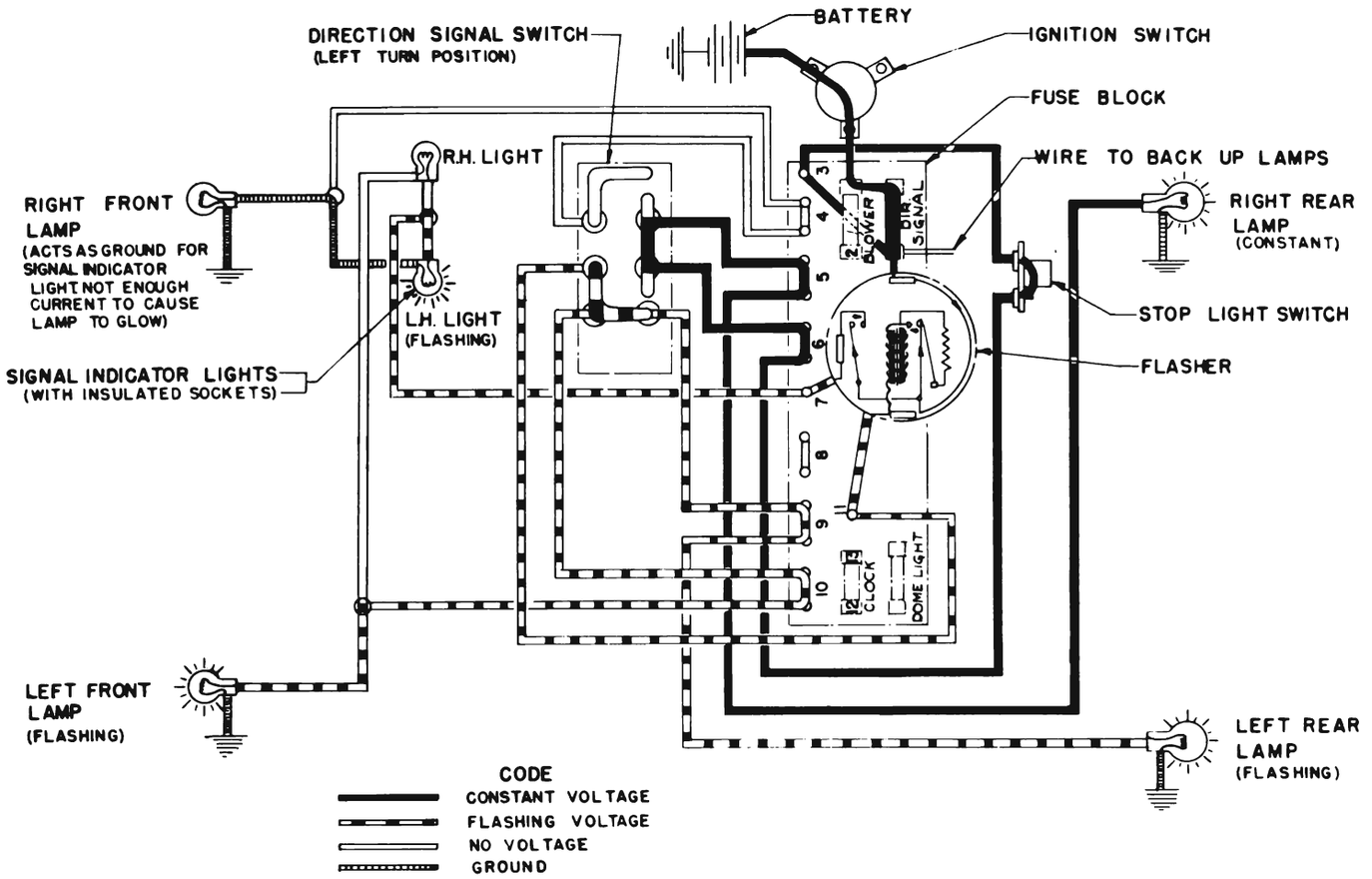

Figure 10-121—Direction Signal and Stop Lamp Circuit Diagram, Stop Light Off, Left Turn Indicated—1949 Series 50-70

right indicator lamp and as the other side is grounded through the left front directional signal lamp, current will flow and the right indicator lamp becomes illuminated. The opposite is true when the switch is placed in a "left turn" position (fig. 10-121). The reason the indicator lamp becomes illuminated, and not the front direction signal lamp through which it is grounded, is because of the higher resistance in the indicator lamp.

10-63 TIMING ADJUSTMENT OF SIGNAL SWITCH CAM

If the direction signal switch cam is correctly located on the hub of steering wheel, the switch will automatically return to the "off" position following a turn, provided that the steering wheel had been turned at least one-third revolution. If the wheel has been turned less than one-third revolution, the switch must be manually returned to the "off" position.

The actual returning of switch to the "off" position takes place as the steering wheel returns to the straight-ahead position. If the switch does not operate as described, the switch cam is not in proper relation to the trigger. See figure 10-122, view A.

The switch cam may be adjusted for correct timing as follows:

1. Make certain that steering wheel is installed on steering shaft so that the lower spoke is straight down when front wheels are in straight-ahead position.

2. Move switch control lever down to indicate a right turn, then rotate steering wheel clockwise until click is heard as the switch trigger drops into a notch in the cam, or a slight movement of control lever is felt. The steering wheel should have been turned at least one-third revolution at this point. See figure 10-122, view B.

3. Hold control lever down firmly and slowly turn steering wheel counterclockwise until the right horizontal spoke is approximately 2½" to the left of the straight-down position. This will cause the cam to slip in its friction mounting on the steering wheel hub. See figure 10-122, view C.

4. Release hold on control lever and turn steering wheel to straight-ahead position. The switch will automatically return to "off" posi-

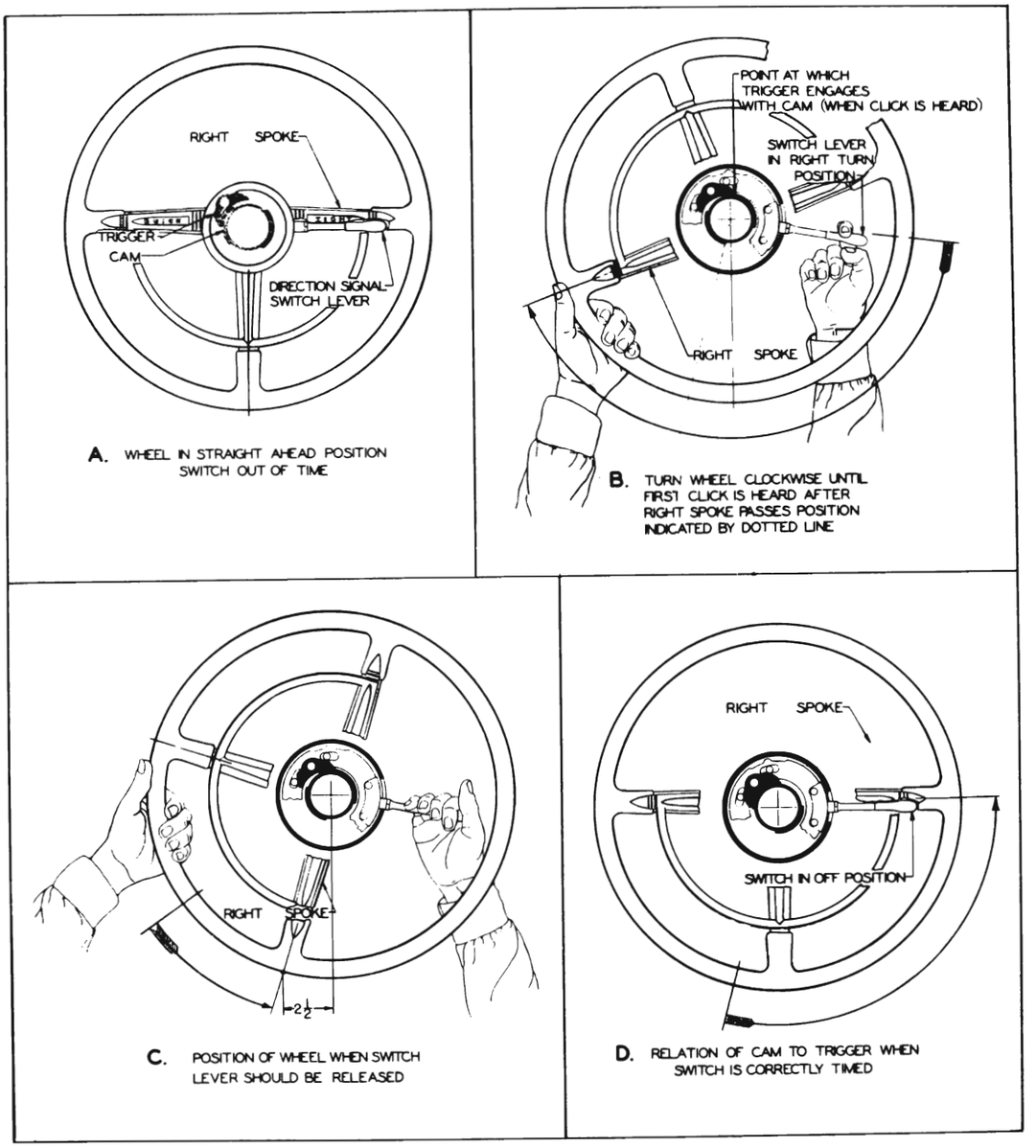

Figure 10-122—Timing of Direction Signal Switch Cam

tion as the wheel is turned. No further adjustment is required for a left turn. See figure 10-122, view D.

5. The clutch friction for maintaining the signal switch cam in the correct position on steering wheel hub is controlled by a crimped steel spring washer. See figure 10-123. If trouble is experienced in maintaining proper timing and adjustment of the cam, the spring washer is probably flattened and too weak, permitting the cam to turn on hub. To check the clutch friction, note the pressure required to hold the control lever while slipping the cam in step 3 above. Compare with another car on which no trouble is experienced. See paragraph 10-64 for replacement of cam or clutch friction parts.

10-64 REPLACEMENT OF SIGNAL SWITCH PARTS

a. Replacement of Signal Switch Cam or Spring Washer

1. Set direction signal switch in "off" position and remove steering wheel (par. 7-6).

2. Remove snap ring, cam, and washers from steering wheel hub.

3. Before installation of parts check spring washer for proper tension. A pressure of 125 to 150 pounds should be required to compress washer to ⅛" height. Make sure that brass washers are in good condition, or install new ones.

4. Install cam and washers on steering wheel hub in the following order: brass washer,

spring washer, brass washer, cam, brass washer, and snap ring. See figure 10-123. CAUTION: *Use care when installing parts to avoid distorting and weakening the spring washer.*

5. Install steering wheel (par. 7-6) and set the timing of signal switch cam (par. 10-63).

b. Replacement of Signal Switch

1. On *1948 models,* disconnect 3-way connector behind instrument panel and disconnect wires from flasher. *On 1949 Series 50-70,* disconnect wires from fuse block under cowl.

2. Set direction signal switch in "off" position and remove steering wheel (par. 7-6).

3. Remove switch control lever and lock washer from lever plate.

4. Remove lever post springs and remove switch rollers from spring post levers.

5. Pry outward on the plate guides far enough to permit removal of the lever plate. Using a screwdriver to pry, remove ball bearing "A" (opposite lever), then bearing "B", and finally bearing "C". See figure 10-124.

6. Remove switch sleeve. Lift out the two spring post levers, which have flat washers on lower pins between levers and switch cover plate. Remove plate guides. See figure 10-125.

7. Carefully work the switch wiring through opening in steering column jacket while lifting the signal switch and cover plate assembly far enough to provide access to switch terminals.

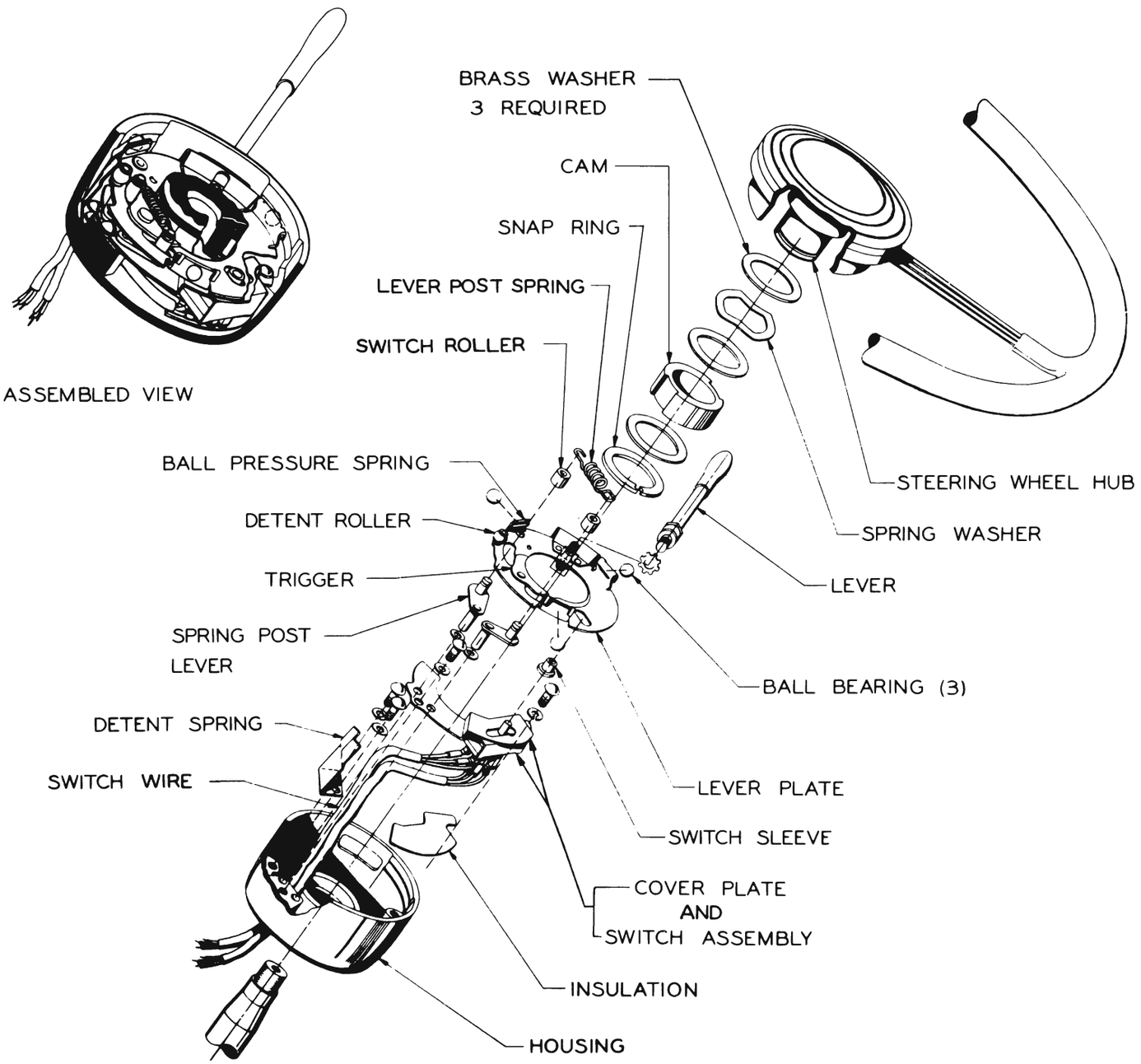

Figure 10-123—Direction Signal Switch—Disassembled

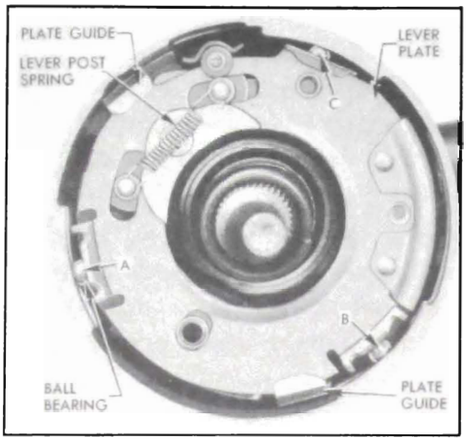

Figure 10-124—Signal Switch Lever Plate

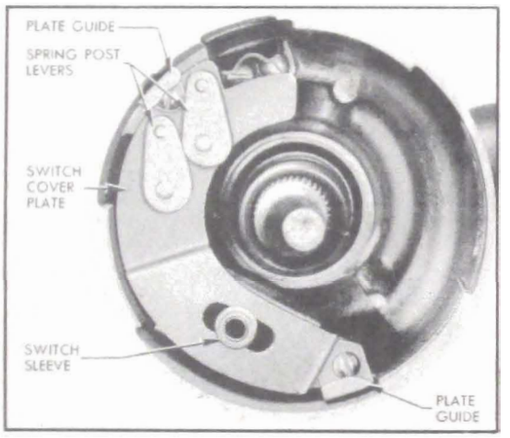

Figure 10-125—Spring Post Levers, Plate Guides, Sleeve, Switch Cover Plate

8. *Carefully note the positions of the three insulators on switch terminals so that these may be reinstalled in the same positions.*

9. Disconnect wires from old switch and connect to new switch, using care to connect each wire to proper terminal and get the insulators in position to protect the terminals from contact with each other or switch housing.

10. Make sure that the switch housing insulation is in place below the switch (fig. 10-123) then work the switch and wire down into place in switch housing.

11. Install plate guides with lock washers on screws. Install spring post levers with flat washers between levers and switch cover. Install switch sleeve. See figure 10-125.

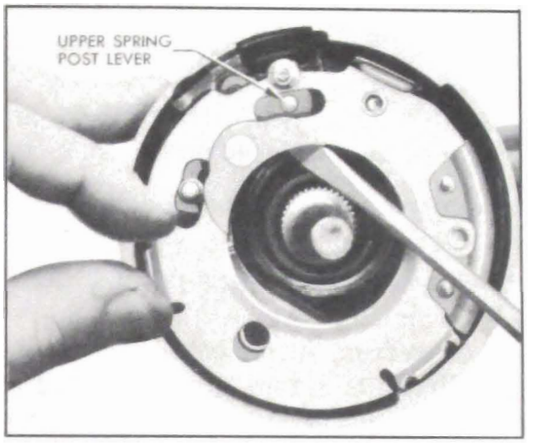

Figure 10-126—Installing Lever Plate

12. Using screwdriver, hold upper spring post lever in position to engage slot in lever plate as the lever plate is installed. See figure 10-126.

13. Tilt lever plate by bearing down on right side (at control lever) and insert ball bearing "A". Next install bearing "B", and finally bearing "C", using screwdriver as a pry. The switch sleeve must be in position in slot of lever plate before installing bearing "C". See figure 10-124.

14. Carefully bend plate guides into position over lever plate by prying between guides and housing with screwdriver. Do not bend guides down by tapping on top lip as lip will not project over plate far enough. Clearance between top of lever plate and guides should be as close as possible without rubbing or interference (approximately $\frac{1}{64}$").

15. Install switch rollers and lever post spring on spring post levers. Lubricate the 3 ball bearings lightly with petroleum jelly.

16. Install control lever, place switch in "off" position and install steering wheel (par. 7-6).

17. On *1948 models*, connect switch wiring at 3-way connector behind instrument panel and at flasher. On *1949 Series 50-70*, connect switch wiring to fuse block under cowl. Check timing of signal switch cam (par. 10-63).