THE

Electric Hand

for 1935

The Electric Hand

Transmission Control
(1935)

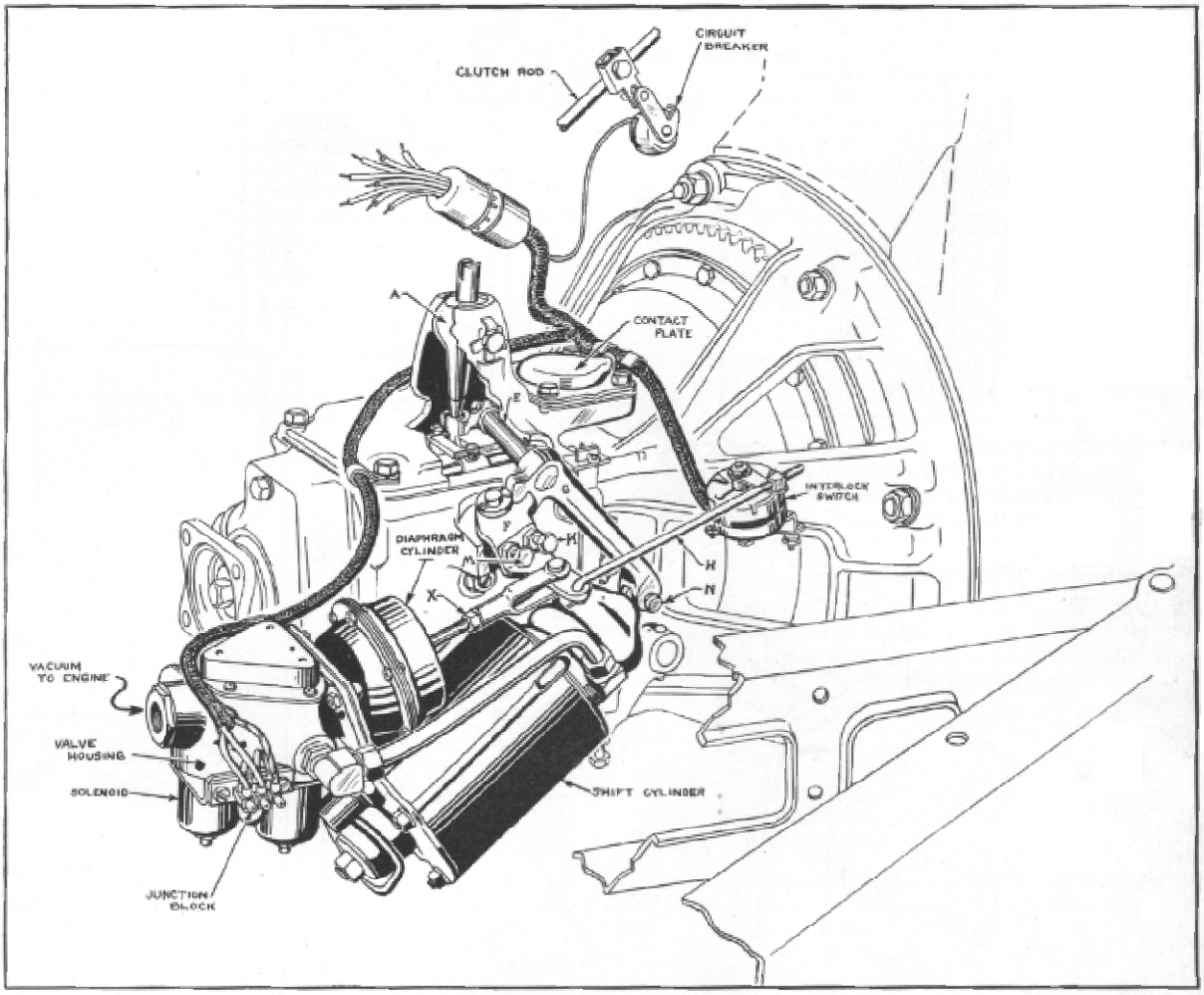


Figure 1

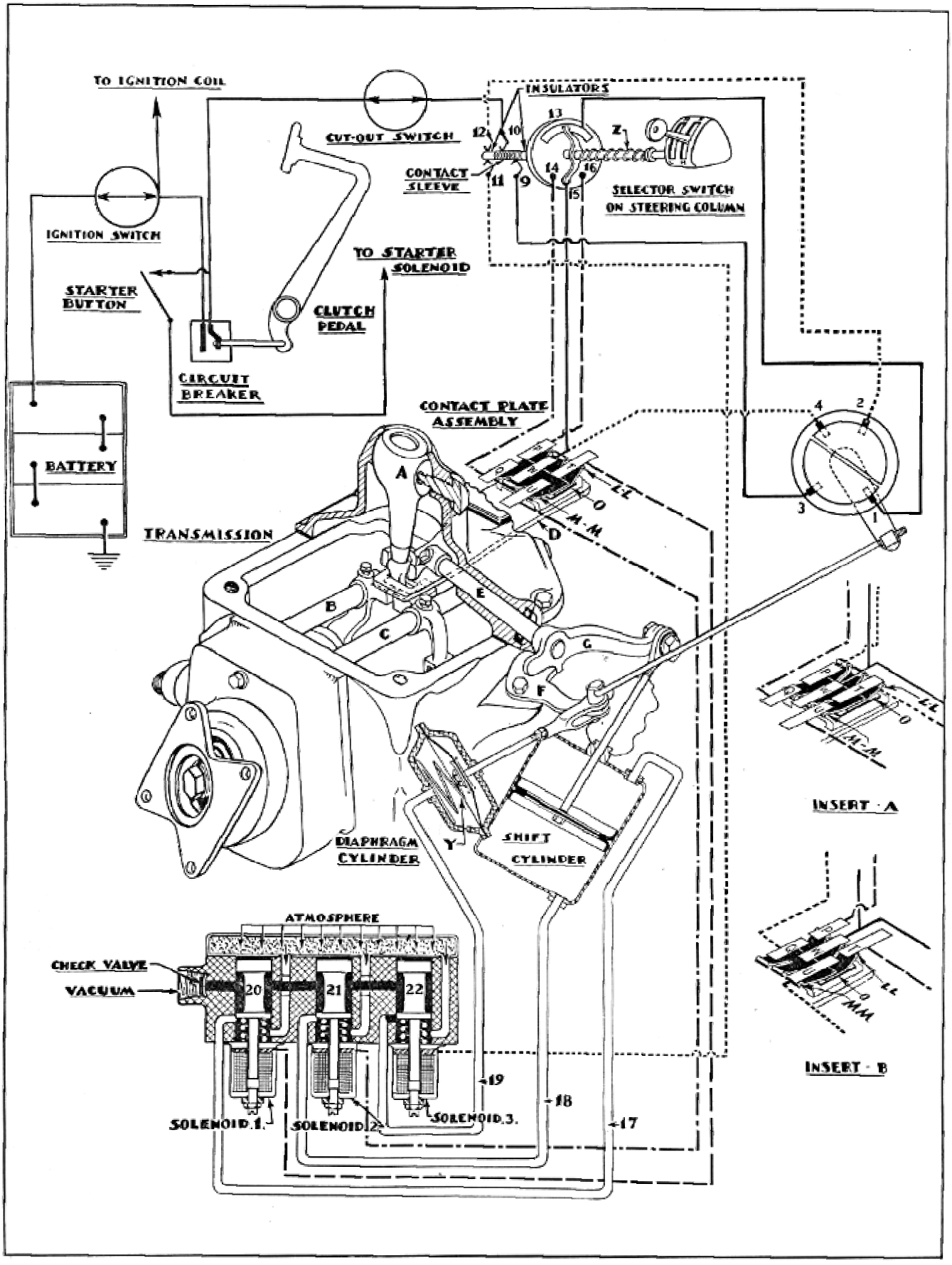
The Electric Hand provides a means of mechanically performing shifting operations formerly done manually.

The conventional selective type transmission has two shifting rails, each having a neutral, a forward, and rearward position. The selection of. the proper rail is obtained by moving the shifting lever sideways to engage a slot in the fork of the rail desired after which movement of the rail and gear engagement is obtained by moving the shifting lever forward or backward. These same operations are performed by the Electric Hand.

The diaphragm cylinder contains a spring which presses forward holding bellcrank F in the position shown so that the shifting lever is held to the left in engagement with the slot in the fork of the high and second shifting rail. By admitting vacuum to the rear of the diaphragm it is moved backward, rotating F clockwise, drawing lever G to the right and also the shifting lever into engagement with the slot in the fork of the low and reverse shifting rail. Referring to Fig. 2, the vacuum connection is shown from the diaphragm cylinder to the valve controlled by solenoid No. 3. The Plunger 22 is held in the upward position by its return spring, the vacuum from the engine is cut off and the atmospheric vent is connected below the plunger to the diaphragm cylinder line allowing the spring Y to force the diaphragm forward.

When the solenoid is energized, plunger 22 is drawn down, cutting off the atmospheric vent and connecting the engine vacuum around the reduced diameter of the plunger, to the diaphragm cylinder (Fig. 3).

Continued on page 3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CIRCUIT BREAKER
BATTERY
CONTACT PLATE ASSEMBLY
TRANSMISSION
INSERT · A
INSERT · B
DIAPHRAGM CYLINDER
SHIFT CYLINDER
ATMOSPHERE
CHECK VALVE
VACUUM
SOLENOID 1.
SOLENOID 2.
SOLENOID 3.

Figure 2

Continued from page 1

When solenoid No. 3 is not energized the spring Y holds the shifting lever "A" engaged with the high and second shift rail (Fig. 2).

When solenoid No. 3 is energized the vacuum draws the diaphragm backward, holding the shift lever "A" engaged with the low and reverse rail (Fig. 3) .

The Shift Cylinder has a vacuum line connected to both the front and rear of the piston. The connection to the front is connected to the valve controlled by solenoid No. 1 and the connection to the rear to the valve controlled by solenoid No. 2. The linkage between the Shift Cylinder Piston and the lower end of the shift lever "A" requires both to move in the same direction.

When solenoid No. 1 is energized, the piston and lever "A" move forward. When solenoid No. 2 is energized, the piston and lever "A" move backward. When neither No. 1 nor No. 2 solenoid are energized both sides of the shift cylinder are open to the atmosphere and the piston is at rest:

Solenoid No. 1 is connected to the stationary bar T of the contact plate and will be energized whenever the circuit from the battery is completed to T. Likewise, solenoid No. 2 is connected to stationary bar U of the contact plate and will be energized by completing the battery circuit to U.

The sliding contacts LL and MM are insulated from each other as well as from their mounting and are moved forward or backward with the transmission lever movement through the connecting bar D. Sidewise movement of the shifting lever "A" does not affect the position of the sliding contacts LL and MM.

The circuit from the battery to T can be completed through the three fingers of sliding contact LL, from either the stationary bar W or P; while the circuit from the battery can be completed to bar U through the three fingers of sliding contact MM from stationary bars 0 or W.

The connection from solenoid No. 3 is direct to contact 11 on the shaft of the selector switch.

From the preceding explanations the following facts have been established:

(1) *Where the circuit is completed from the battery to T the shifting rail movement will be forward.*

(2) *When the circuit is completed from the battery to U the shifting rail movement will be to the rear.*

(3) *When the circuit to 11 is open, the shifting lever "A" will be pressed toward the notch in the high and second shifting rail, B.*

(4) *When the circuit 11 is closed, the shifting lever "A" will be drawn toward the low and reverse shifting rail, C.*

The selector switch, in conjunction with the contact plate and the interlock switch (Fig. 1), controls the circuits to these points.

The selector switch Fig. 2 has five positions arranged in the form of the letter H. The cross bar represents the neutral position while the four ends of the uprights of the H correspond to the four gear positions of the transmission and are arranged in the same order as the positions of the conventional transmission shifting lever.

In Fig. 2 the selector switch is shown in its normal neutral position. The spring "Z" holds the shaft and the lever to the right end of the cross bar of the H in line with the high and second gear positions. Note that this corresponds to the normal position of the shifting lever "A" which is held in proper engagement for a direct shift into high or second by the spring "Y" of the diaphragm cylinder. It is, therefore, unnecessary to provide a contact for 11 for shifting to high or second gear as no cross shift is required and 11 rests on an insulated sleeve on the selector switch shaft. If, however, the control lever is pushed to the left of the cross bar, in line with low and reverse positions, it is necessary to have a cross shift to engage the low and reverse shifting rail. The contact sleeve on the selector switch shaft is moved to the left by the left movement of the control lever so that it is contacted by 11.

The rotating motion of the selector switch lever rotates a contact bar which is always in contact with sector 13 and also contacts 14 when the lever is in reverse or second, 1.5 when in neutral and 16 when in high or low.

Having now provided the means of shifting the transmission and a switch for selecting the gear required, the actual circuits for obtaining the desired movements for a given position of the transmission and selector switch will now be considered.

The circuit from the battery leads to the ignition switch to the circuit breaker on the clutch pedal, (circuit closed with clutch depressed) the cut off switch an the selector switch housing to contact 10 which is at all times in contact with the sleeve on the shaft of the selector switch.

With the selector switch in the normal neutral position and the transmission in neutral as shown in Fig. 2 the circuit from 10 is completed to 9 to 3 and 1 on the interlock switch to 13 and 15 on the selector rotary switch to contact bar W. (Circuit shown in solid lines.)

With the transmission in neutral, neither LL nor MM contact W, so that the circuit is broken at this point and no movement of the shift rails is obtained.

If, however, the transmission were in high gear, the shifting lever "A" would be forward holding LL and MM forward as shown in Insert A. This would bring the middle finger of MM in contact with W closing the circuit to U and solenoid No. 2, and the shifting lever "A" would be moved backward to neutral at which point contact would be broken as in the main diagram of Fig. 2 and movement would cease.

With the transmission in second gear the contacts LL and MM would be moved backward (Insert B) and contact would be made from W to LL to solenoid No. I and the shifting lever would move forward to neutral breaking the contact.

It is readily seen that moving the selector switch down into high gear position would not affect the circuit except from 13 to 16

[Page 3

which would connect (circuit in broken line) to P through LL to solenoid No. 1 and shift rail B would be moved forward from neutral engaging high gear. As the shifting lever and rail moved forward LL and MM would also move forward and the contact between P and LL would be broken, as shown in Insert A. Note that contact is made from P to LL to T with the contact plate either in neutral or the backward position; and the shift would be made to high gear if the transmission was in either second or neutral when the selector switch was moved to high gear position.

Now, moving the selector switch over to the second gear position completes the circuit (dash dot lines) from 13 to 14 to Q through MM to solenoid No. 2, moving the shift rail B backward from neutral to second gear position at which point the contact between Q and MM is broken (Insert B).

Note that contact is completed from Q to MM to U both with the contact block in neutral and the forward position so that the shift would have been made to second gear if the transmission were in either high or neutral when the selector switch was moved to the second gear position.

Fig. 3 shows the selector switch in neutral but moved to the left of the cross bar of the H and the transmission in neutral. With the left movement of the selector switch lever, the contact sleeve has also moved to the left, breaking contact with 9 and contacting 11 and 12. (Completed circuits shown in solid lines.) Solenoid No. 3 having been energized from contact 11 has moved the shifting lever into contact with the fork of shifting rail C so that forward and back-ward movement will now engage low or reverse gears. Note also that the interlock switch has been turned by the backward movement of the diaphragm.

The circuit from 12 is to 2-1 on the interlock switch to 13 to 15 to W. This duplicates the condition in Fig. 2 so that the transmission will be returned to neutral from either low or reverse. Turning the selector to contact 14 now corresponds to reverse and 16 to low gear and forward or backward movement of the shifting lever will engage and disengage low and reverse in the same manner that high and second were controlled in Fig. 2. (Circuit for low shown in broken lines, circuit for reverse in dot and dash.)

Fig. 4 shows the transmission in low gear and the selector switch in high. The shifting lever is held to the right as the spring Y cannot force it to the left until the shifting rail has moved to neutral, and the interlock switch is still held in the low and reverse position as in Fig. 3.

When the clutch pedal is depressed the circuit (solid lines) is closed through 10-9 to 3-4 on the interlock switch to W. As shown previously, a completed circuit to W caused the transmission to move to neutral. In this instance the controlling circuit (solid lines) is from W through MM to U to solenoid No. 2 and the first part of the shift will be from low to neutral.

As soon as the shifting lever "A" reaches the neutral position, the spring Y forces it to the left to engage in rail B. This cross movement also turns the interlock switch back to the high and second position as shown in the insert, so that the circuit from 9 is changed (changed circuit shown in broken lines) to 3 to 1 on the interlock switch to 13 and with the selector switch set for high gear, to 16 to P-LL to T and a normal shift from neutral to high is made.

Had the selector switch been set in second gear the connections would be the same until neutral is reached when the circuit will be completed (circuit in dot and dash) from 13 to 14 to Q-MM to U, causing a normal neutral to second shift.

Fig. 5 shows the transmission in high gear and the selector switch set for low. The interlock switch is in the high and second position.

When the clutch pedal is depressed (completed circuits in solid lines) the circuit is completed from 10 to both 11 and 12. The circuit from 11 energizes solenoid No. 3, but since the shifting lever "A" cannot move to the right until shift rail B reaches the neutral position, no movement is caused and the interlock switch remains in the high and second positions.

The circuit from 12 is completed to 2-4 on the interlock switch to contact bar W through MM to U, causing the shift rail B to be moved backward to neutral. Here the movement is arrested by breaking contact between W and MM and the vacuum acting on the diaphragm causes the shift lever "A" to move to the right rotating the interlock switch to the low and reverse position.

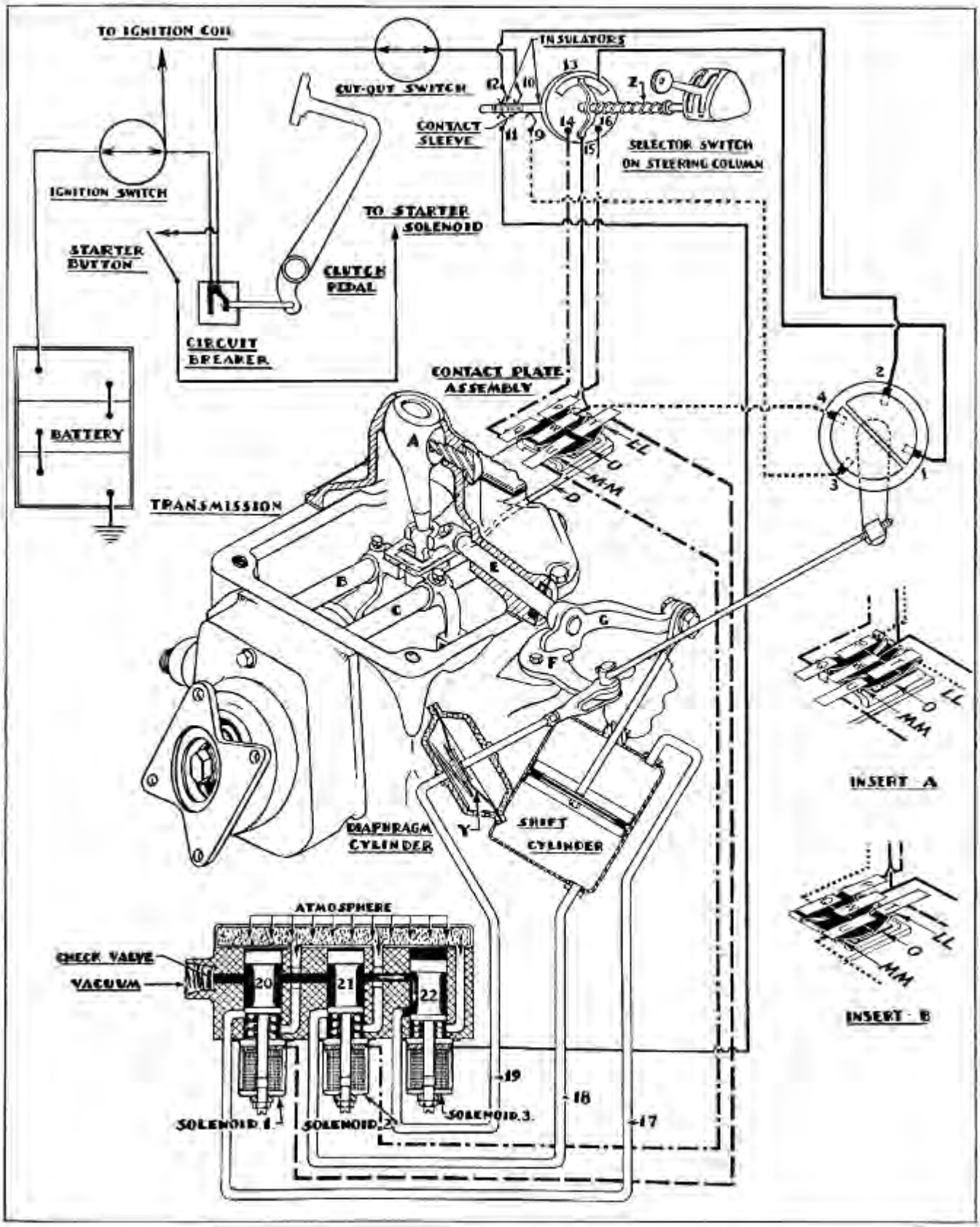
The circuit from 12 has now been changed as shown in the insert and is completed (circuit in broken line) through 2-1 of the interlock switch to 13 to 16 to P through LL to T causing a normal neutral to low shift.

Had the selector switch been set to reverse, connecting 13 and 14, the circuit (circuit in dot and dash) would then have been completed to Q through MM to U, causing a normal neutral to reverse shift.

In this discussion it has been seen that the interlock switch has no function so long as the selector switch and the gear shift lever are set so that a straight forward or backward movement of the shift lever "A" is required; however, if a cross movement of the shifting lever "A" is required to complete the desired shift, it requires the transmission to come to neutral and will not permit any further movement of the shifting rails until the cross movement is completed.

As a safety factor the circuit breaker makes it impossible to make a shift until the clutch has been disengaged.

Due to the fact that the selector switch lever can be moved to any position after the engine has been stopped without a shift being made, it is impossible to tell by the position of the selector switch lever whether or not the car is in gear when the engine is dead. To prevent starting the engine with the car in gear a circuit breaker on the clutch pedal requires the disengagement of the clutch before the starter switch circuit is complete.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SELECTOR SWITCH ON STEERING COLUMN
IGNITION SWITCH
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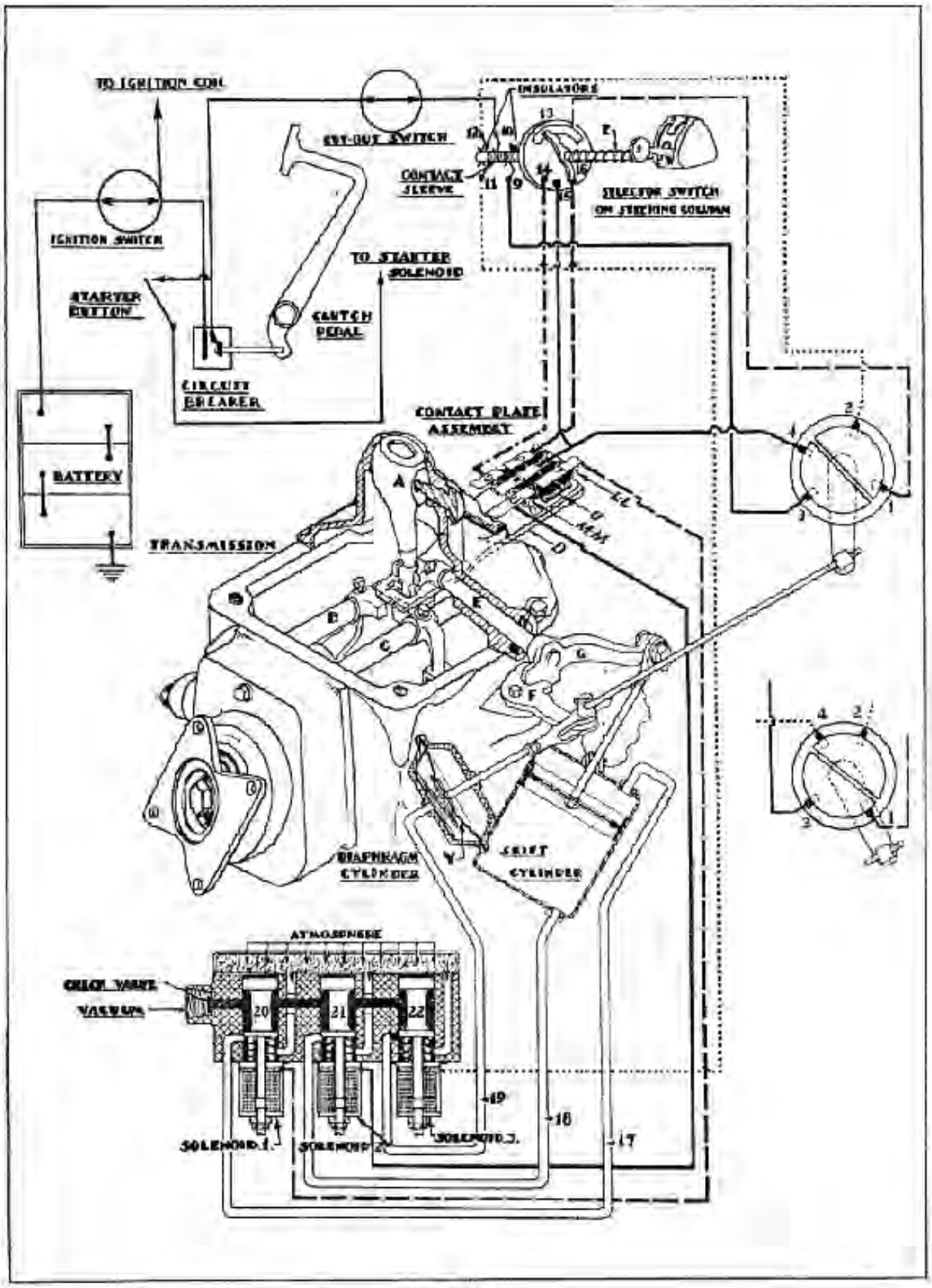
STARTER BUTTON
CLUTCH PEDAL
CIRCUIT BREAKER
BATTERY
CONTACT PLATE ASSEMBLY
TRANSMISSION
LL
O
MM
D
A
B
C
E
F
G
Y
DIAPHRAGM CYLINDER
SHIFT CYLINDER
INSERT A
INSERT B
ATMOSPHERE
CHECK VALVE
VACUUM
SOLENOID 1
SOLENOID 2
SOLENOID 3
17
18
19
20
21
22

Figure 3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DIAPHRAGM CYLINDER
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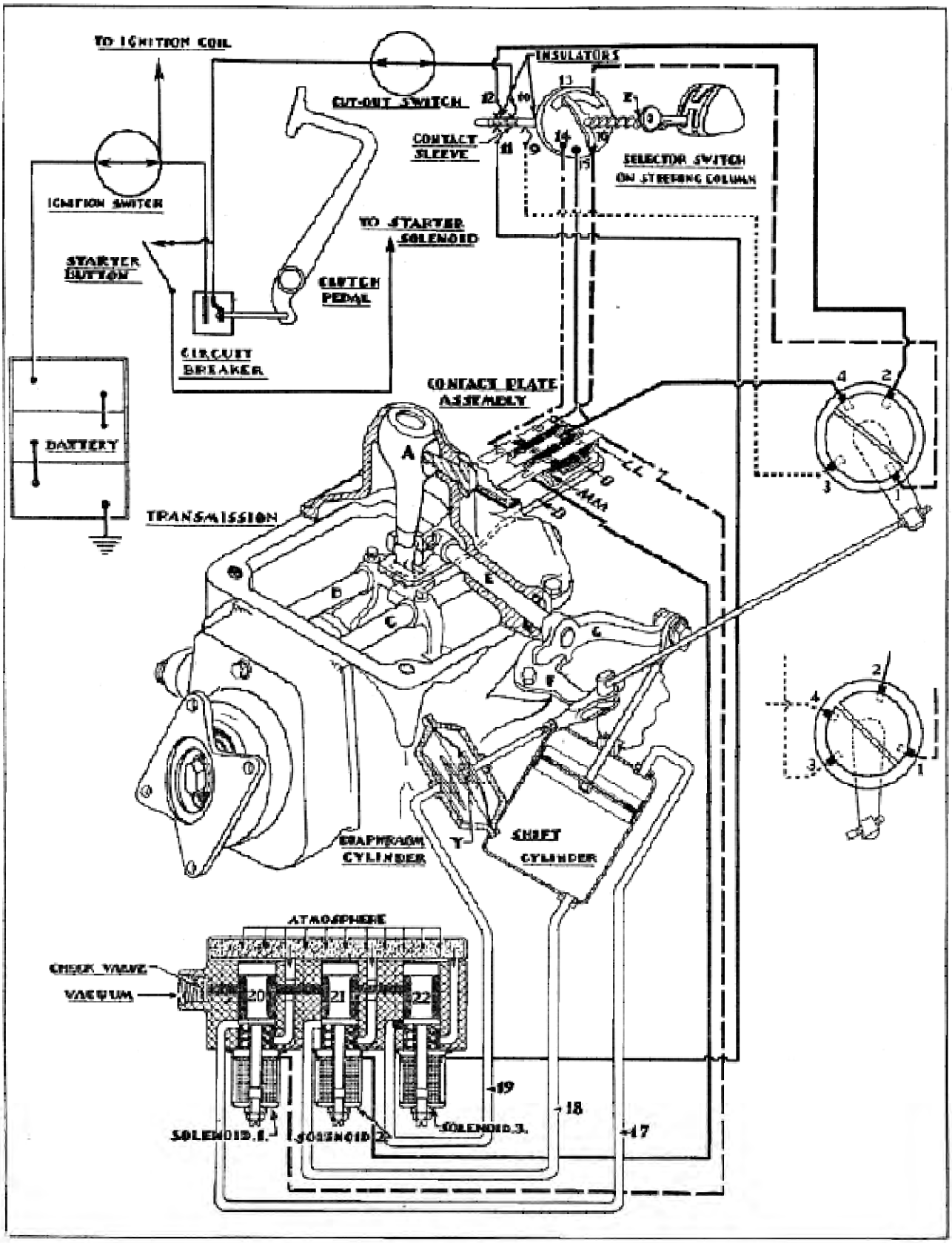
SOLENOID 3.

Figure 4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VACUUM
SOLENOID 1.
SOLENOID 2.
SOLENOID 3.

Figure 5

Mechanical Adjstments

(A) - Adjustment of Cross Shift Stop Screws (Figure 1, Page 1)

1 - Shift transmission into high gear.

2 - Back off stop screw K until it does not touch the stop.

3 -Turn stop screw K in until it just touches stop, then turn in an additional 1/4 turn and tighten lock nut. After this adjustment is made a .004" feeler should just pass between the outside face of the lug on lever G and the outside finger of bell crank F.

4 - Shift transmission into low gear, using power unit.

5 - Back off stop screw M until it does not touch the stop.

6 - Turn stop screw M in until it just touches the stop, then turn an additional 1/4 turn and tighten lock nut. After this adjustment is made a .004' feeler should just pass between the inner face of the lug on lever G and the inner finger of bell crank F.

(B) Adjustment of Length of Diaphragm Cylinder Shaft (Figure 1, Page 1)

1 - Remove clevis pin from diaphragm cylinder rod clevis.

2 - Loosen lock nut X.

3 - With bell crank lever F pushed forward so that stop screw K is against its stop, turn the clevis until the clevis pin hole is 1/4" ahead of the hole in the lever when the diaphragm cylinder rod is in its extreme forward position. Tighten lock nut X.

4 - Push diaphragm cylinder rod back to align holes and replace clevis pins.

(C) Adjustment of Interlock Switch

1 - Shift transmission into low gear and then into high gear. The pointer on the interlock switch lever should register with the line on the interlock switch cover. If not, adjust as follows:

2 - Loosen front stop; then turn rear stop until alignment is obtained while interlock switch lever is held back against rear stop. Then tighten front stop.

3 - Shift transmission into low gear, then to high and recheck to see that pointer registers with line on interlock switch cover.

(D) Adjustment of Power Cylinder Piston Rod (Figure 1, Page 1)

1- Shift transmission into high gear. Remove clevis pin N from lever G.

2 - Push rubber piston rod guard back and loosen lock nut on piston rod.

3 - Turn rod end until clevis pin N can be reinserted with the piston rod pulled to its extreme forward position.

4 - Push piston rod back and lengthen four threads by turning clevis. Tighten lock nut.

5 - Reinsert clevis pin N.

(E) Adjustment of Clutch Circuit Breaker

With clutch fully engaged, the pointer on the lever should be in line with the arrow on the top of the circuit breaker housing. To adjust:

1 - When equipped with automatic clutch control - loosen clamp bolt nut on bracket mounted on vacuum clutch rod and slide clip until pointer is in line with arrow on housing. Insert cotter pin and tighten lock nut.

2 - When not equipped with automatic clutch control-remove cotter key from circuit breaker lever pin. Loosen lock nut on operating rod and remove rod end from lever pin. Turn rod end until it will slip on pin with pointer in line with arrow on housing. Insert cotter pin and tighten lock nut.

The position of the circuit breaker lever is important. If the contact is made with too little clutch pedal movement, the clutch will still be engaged when the shift is made and if a gear has been pre-selected the shift will be made while the engine is driving the car. If the contact requires too much pedal movement, the shift will not be completed should the gears butt teeth. It is necessary to have a slight clutch drag before the circuit is broken to turn the gears and insure engagement. It may be necessary, therefore, to set circuit breaker slightly ahead of indicating arrow.

Service Parts Assemblies

47739-Selector Switch - wires and Jacket Tube Assembly. Used on all Terraplane and Hudson models, except Hudson Custom.

48137-Selector Switch Wires and Jacket Tube Assembly - Hudson Custom models.

47327 - Switches and Wires Assembly. All models.

47322 - Transmission Control Power Unit Assembly. All models.

47250 - Clutch Circuit Breaker. All models.

47944 - Interlock Switch. All models.

Testing Equipment
Kit No. 47898

1-Master Selector Switch.

2-Lower Harness Test Set.

3--Power Unit Test Cable.

Service Operations

Preliminary Service Check

The following are to be checked before attempting to make any repairs to the gear shift control mechanism, regardless of the nature of the failure:

1 - Be sure Cutout Switch on selector housing is “on.”

2 - Be sure that transmission is free and can be moved into all its positions manually with clutch pedal depressed just enough to close circuit through clutch circuit breaker. (Check by pressing starter button.) Adjust interlock straps on transmission if necessary.

3 - If temperatures are encountered low enough to cause the recommended transmission lubricant to retard gear shifting excessively, replace 3 ounces of the lubricant with kerosene.

4 - Inspect vacuum line and fittings.

5 - Check wire connections on Interlock Switch.

6 - Make certain that all clevis pins and cotter pins are in place.

7 - Inspect junction block on power unit to see that all six wires are in place.

8 - Make certain that all soldered connections are intact in both portions of steering column jack. (To remove covers, twist, with jack assembled.)

9 - Check wiring harness for breaks or damaged insulation.

Quick Test for Short Circuit

With instrument panel lamp lighted, shift into all positions with Electric Hand. Any appreciable dimming of instrument lamp indicates short circuit in that position.

Gears are Shifted with Clutch Engaged

Probably short circuit in clutch circuit breaker or improper position of circuit breaker arm.

1 - Check and if necessary adjust clutch circuit breaker.

2 - Turn on ignition switch and press starter button-if starter operates with clutch fully engaged, replace circuit breaker.

Complete Failure of Electric Hand to Function

After setting pointer and arrow on circuit breaker in line, turn on ignition switch, depress clutch pedal and press starter button. If starter functions, circuit is closed through circuit breaker. If starter does not function, attach grounded test lamp to yellow wire terminal of circuit breaker. No light indicates open circuit from ignition switch to circuit breaker. Light indicates circuit breaker circuit open. Replace circuit breaker.

Failure of Electric Hand to Function in Any or All Positions

If a proper circuit is proven through the circuit breaker and operation is still faulty, disconnect the separable jack on the bottom of the steering column and insert the jack from a Master Selector Switch and wire assembly. (This unit does not require any ground.) If the system functions properly when using this selector switch instead of the one mounted on the car, replace the complete selector switch and wire assembly. This includes all parts on the steering column, including the upper part of the separable jack.

Testing the Shifting Mechanism

1 - Connect Power Unit Test Cable to the terminal on the clutch circuit breaker to which the red wire is attached. This wire should be "hot" only when the clutch is disengaged.

2 - With the engine running and the clutch disengaged (Rear wheels of car jacked up) touch the front post (YB) of the junction block on the shifting unit with test prod. The transmission should shift into high gear. Touch rear post (Y) and the transmission should shift to second gear.

3-Shift the transmission to neutral manually. First touch center post (W) with the test prod and the cross shift should be made. Still contacting "W," touch front post "YB" with second test prod. The transmission should shift into low. Touch rear post (Y) still contacting (W), and the shift should be made to reverse.

If a shift is not made when one of the posts is contacted, connect an accurate ammeter to the hot wire and to the terminal. A current draw of approximately 2.5 amperes indicates the solenoid is O. K. A higher amperage indicates a short and a low amperage an open circuit.

Caution: A dead short circuit in a solenoid will burn out ammeter if permanent connection is made.

the hot wire and to the terminal. A current draw of approximately 2.5 amperes indicates that the solenoid is 0. K. A higher amperage indicates a short and a low amperage an open circuit.

If the current draw is correct, the trouble may be due to the valve plunger sticking in its upward position, a vacuum leakage in the lines or units or a mechanical drag in the mechanism.

Disconnect the shifting cylinder piston rod from the shifting lever or the diaphragm cylinder from the cross shift bell crank. If these do not function after disconnecting the linkage, the entire power unit should be replaced.

Testing Circuits in Lower Harness and Switches

If only partial functioning or complete failure is experienced after the Master Selector has been plugged in, test the complete circuits at the solenoid junction block with lower harness test lamp set. (This test must be performed with a Selector Switch known to be 0. K.)

(a) - Remove the three wires on end of wiring harness from junction block on selector valve.

(b) - Insert these three wires into jack fitting on Lower Harness Test Set, in correct position according to color.

(c) - Attach ground clip to a clean metal ground on car.

(d) - Turn ignition switch "on," turn cutout switch "on," and hold clutch fully disengaged.

(e) - Place Selector Level in neutral. Place transmission in neutral manually.

When shift lever is moved a short distance toward "second," test lamp "YB" should light. When shift lever is moved a short distance toward "high," test lamp "Y" should light.

(f) - With transmission in neutral, move Selector Lever to "low." Test lamp "W" only must light.

(g) - Transmission remains in neutral. When Selector Lever is moved into "second" position, test lamp "Y" should light. When Selector Lever is moved into "high" position, test lamp "YB" should light. Selector in low or in reverse lamp "W" only should light.

(h) - As the transmission is shifted manually to correspond to any position chosen at the selector switch, the proper lamps, as indicated in "g," should remain lighted during the shift. However, lamp "Y" or "YB," whichever is lighted, should go out when the shift is completed. Lamp "W" alone will remain lighted in "low" or "reverse" position. If, in any of the above test, the correct lamps do not light or additional lamps are lighted, replace 47327 Switches and Wires Assembly.

Test to detect improper contact plate adjustment. If, after a new lower harness assembly has been installed, either lamp ityly or "YB" remains on when transmission is in neutral, in test (e) above, the contact plate is incorrectly adjusted. To adjust contact plate, loosen the four screws holding contact plate assembly, then see if plate is free to move back and forth through movement permitted by elongated holes. If not, remove plate from transmission cover and carefully cut off or remove locating dowel pins. Replace contact plate as nearly as possible in its original position and partially tighten the four screws so that plate may be moved to its proper position.

If test lamp "YB" remains lighted when transmission is in neutral, move plate very slightly to the rear until lamp "YB" goes out. (If lamp "Y" remains lighted, move block forward. The proper setting is obtained when the movement of shift lever forward from neutral necessary to bring lamp "YB" on, is equal to the backward movement required to bring lamp "Y" on.

To Check Position of Interlock Switch

Place the transmission in low gear and the selector switch in high gear and depress the clutch. Lamp "Y" should light and remain lighted until the transmission is shifted (manually) to neutral. Lamp "YB" should be lighted when cross shift to second and high side is completed. If lamp "YB" is lighted before the cross shift is practically completed, the interlock switch is not in proper position and should be adjusted so that the pointer on its lever is in line with the mark on the housing when the transmission is in high gear. If adjustment does not give proper operation, replace the interlock switch.

If the above tests show that some circuits are not correct, replace the wires and switches assembly (lower harness with interlock switch and contact plate).

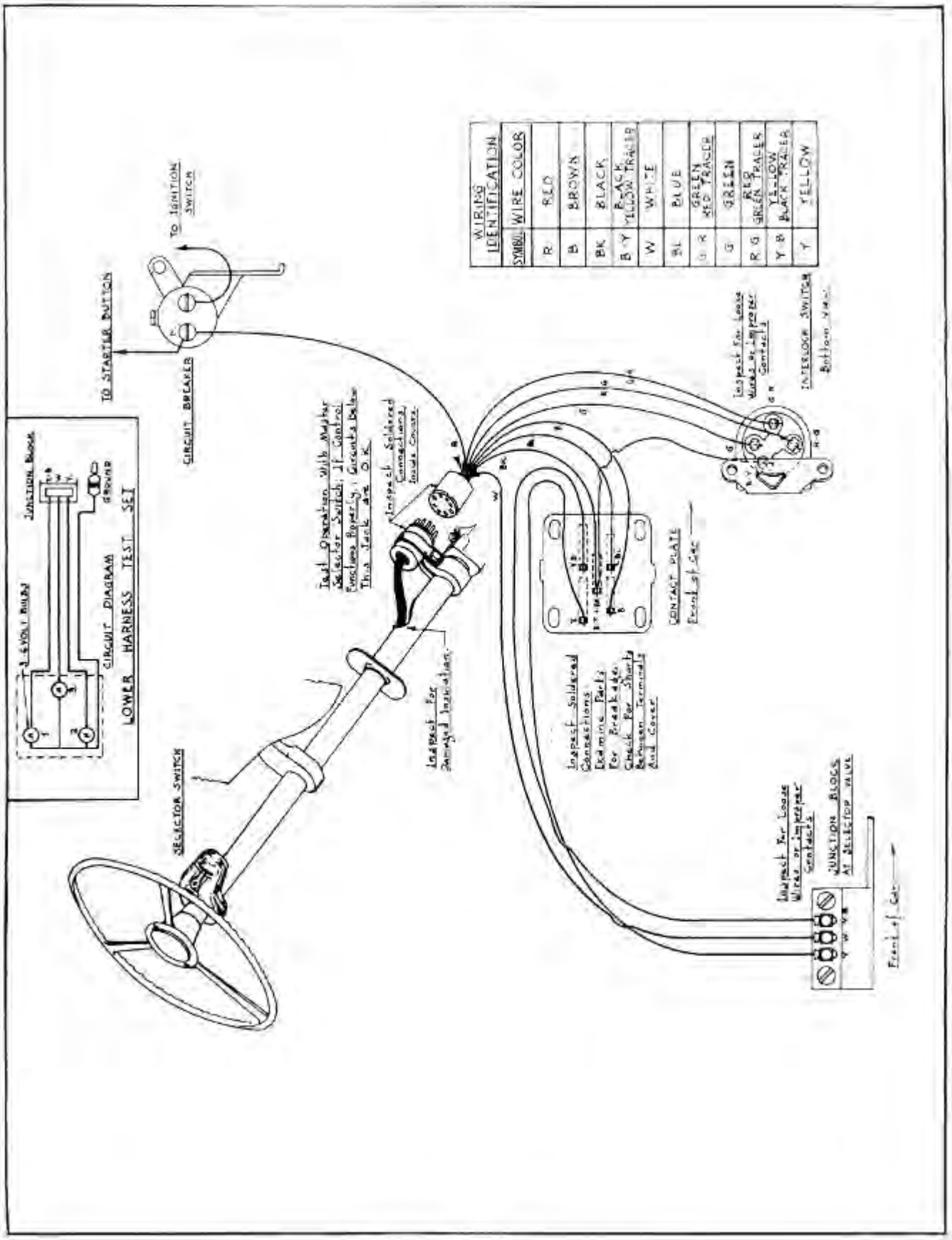

WIRING IDENTIFICATION
SYMBOL WIRE COLOR
R RED
B BROWN
BK BLACK
B-Y BLACK YELLOW TRACER
W WHITE
BL BLUE
G-R GREEN RED TRACER
G GREEN
R-G RED GREEN TRACER
Y-B YELLOW BLACK TRACER
Y YELLOW
LOWER HARNESS TEST SET
CIRCUIT DIAGRAM
6 VOLT RELAY
JUNCTION BLOCK
GROUND
CIRCUIT BREAKER
TO STARTER BUTTON
TO IGNITION SWITCH
SELECTOR SWITCH
Inspect for Damaged Insulation
Test Operation With Selector Switch; If Control Functions Properly, Circuits Below This Jack Are O.K.
Inspect Soldered Connections Inside Cover
Inspect Soldered Connections For Mirror Parts For Breakage. Check For Shorts Between Terminals And Cover
CONTACT PLATE
Front of Car
Inspect For Loose Wires or Improper Contacts
INTERLOCK SWITCH
Bottom View
JUNCTION BLOCKS At Selector Valve
Front of Car

Figure 6

Electric Hand Test Equipment

Kit No. 47898

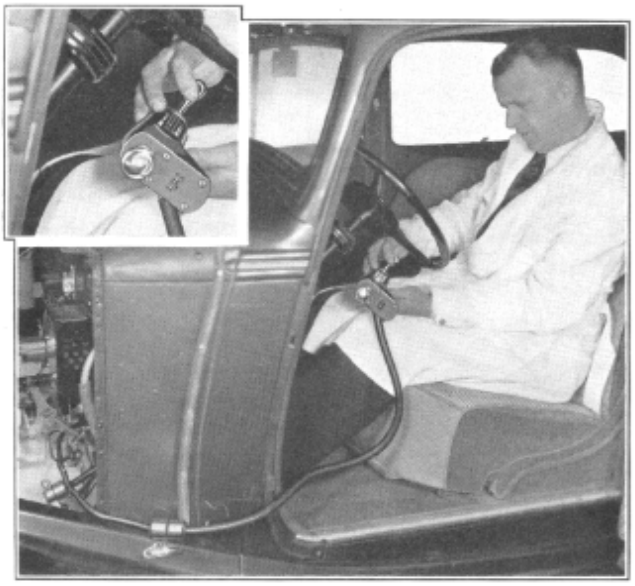


Figure 7
Using Master Selector Switch to make comparative check of Selector Switch and testing for "shorts"

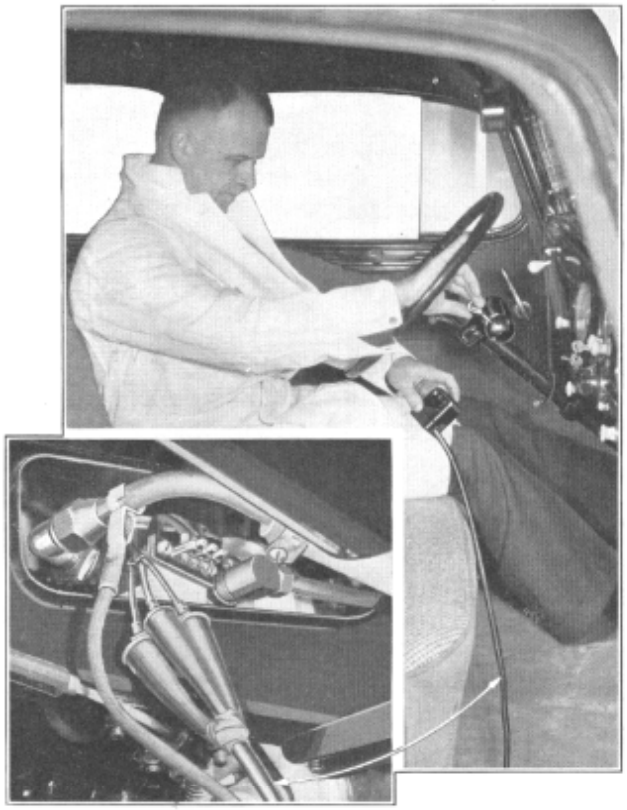


Figure 10
Testing circuits in lower harness and switches
Insert shows connection of test lamps to lower harness

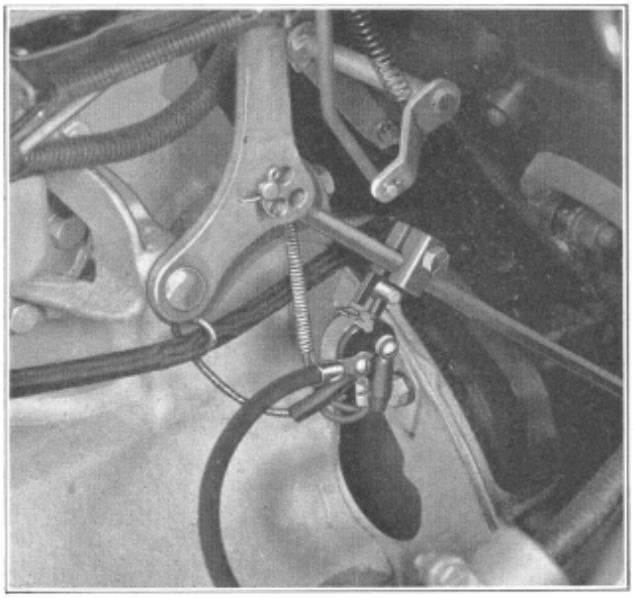


Figure 8
Connection of test cable to clutch circuit breaker

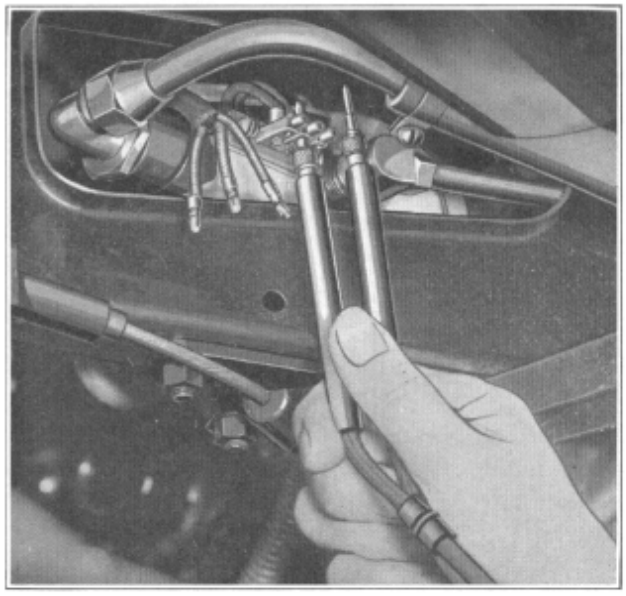


Figure 9
Using prods at solenoid terminals

Testing the power unit operation and mechanical adjustments

These three tests made in the above order quickly and positively locate electrical or mechanical troubles in the Electric Hand system

Failures Resulting from Faulty Circuits

See Wiring diagram, Fig. 6. A faulty selector switch may cause any of the failures listed below. A master selector switch should be used when checking the control. If control operates perfectly with master selector switch, an investigation of the other units is unnecessary.

Transmission fails to move into:	Faulty circuit through: (See Note)	Transmission fails to move out of
Any position	Red Wire	Any position
Any position	Green Wire with Red Tracer	Any position - except that transmission may be brought to neutral by moving Selector Switch to opposite side of gate*
Low* Reverse*	White Wire or Green Wire**	
Low High	Blue Wire	
Neutral - except when Selector Switch is moved to opposite side of gate***	Black Wire	
Second Reverse	Brown Wire	Low High
Second Reverse	Yellow Wire	Low High
Low High	Yellow Wire with Black Tracer	Second Reverse
Second High	Red Wire Green Tracer	
Certain positions unless started manually	Transmission contact plate assembly. Surface of contact bars *must be* carefully cleaned.	Certain positions unless started manually
Transmission fails to follow a fast or "pre-selective" shift from a position on one side of the gate to a position on the other side (from low to second, or from high to low, for example	Black Wire with Yellow Tracer	Transmission will follow when selector switch is moved very slowly.

NOTE:-Faulty circuit may be caused by either a short or an open circuit. In most cases, failure will be due to an open circuit, but when a short is encountered, Master Selector Switch fuse will blow. When this occurs, lamp adjacent to fuse should burn at full brilliance. (A 6-8 volt, 32 CP, single contact bulb must, be used. Allow Master Switch to remain in position which caused fuse to blow (i.e., in a position in which bulb burns at full brilliance). Then check faulty circuit for a short. When short is located and eliminated, bulb will burn at approximately half brilliance-which is normal. After short has been eliminated, insert new 7-1/2 ampere fuse and check operation of control in all positions.

(*) If green wire with red tracer is damaged, transmission will not move out of neutral position into any other position, but if it is placed in high position manually, it may be brought to neutral by moving Selector Lever into "Low." If placed in low position manually, it may be brought to neutral by placing Selector Lever in "high."

(**) If green wire is damaged, shift lever will still move back and forth with Selector Lever as the latter is moved from left to right.

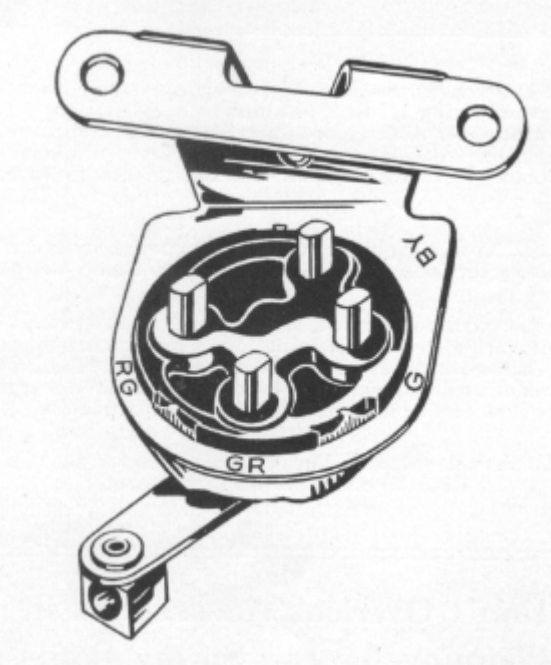
If white wire is damaged, shift lever will remain on the second and high side, even though Selector Lever is moved back and forth from right to left.

(***) If black wire is damaged, it is impossible to place transmission in neutral by merely moving Selector Lever to "Neutral." However, if transmission is in either second or high position, it may be placed in neutral by moving Selector Lever to "Neutral" and then as far to the left as possible. Transmission may be moved into and out of every position, except neutral, in the normal manner.

Electric Hand Notes

Interlock Switch Marking

The first interlock switches used in production did not have the terminals marked to indicate what wire should be attached to each. The illustration shows the markings now being used. BY indicates black wire with yello,~ tracer; G, green wire; GR, green wire with red tracer; RG, red wire with green tracer.



If a switch without the markings is removed from a car, it should be marked as shown in the illustration to aid in reassembling the wires.

Using Testing Equipment

Paragraph (g) on page 10 of Reference Sheet No. 3 should read the same as (g) on page 32 of the January issue of Terraplane Hudson Service. When the transmission is in "normal" neutral and the selector switch is moved to low or reverse, only lamp W of the lower harness testing set should light.

In some cases, light Y or YB will flash as the selector switch is moved only slightly from neutral. This is due to the selector switch contact touching the switch point to which the shift is being made before breaking contact with the neutral point of the selector switch. Disregard this flashing of the light, as the condition causing it does not interfere with the correct functioning of the Electric Hand.

Adjusting Clutch Circuit Breaker

Reread the instruction under (E) on page 30 of the January issue. The adjustment of the clutch circuit breaker is important. To test f or the correct position of circuit breaker, shift into low gear and allow the clutch pedal to come back slowly until the clutch just begins to drag. This is indicated by a slight vibration in the engine, but should not cause the car to move. While holding the clutch pedal in this position, move the selector to neutral. The transmission should shift to neutral. If it does not shift, move the clutch pedal down slightly. The amount the pedal has to be depressed to complete the shift is an indication of the amount the clutch circuit breaker arm pointer must be adjusted forward from the normal position mark.

If too much downward pedal movement is required to close the Electric Hand circuit, the shift will not be completed if an end to end condition of gears is encountered. This happens only when the car is standing still and is usually noticed only in attempting to shift into low or reverse.

If insufficient pedal travel is necessary to close the Electric Hand circuit, the gears will grate if a gear is pre-selected, due to the clutch not being sufficiently disengaged when the shift is made.

Manual Gear Shift Lever

All electric hand equipped cars now have the manual shift lever held in a socket and a strap with a snap fastener located just ahead of the right front door.

Installation of Electric Hand Air Filter

When installing Air Filter Kit No. 48250 (Distributor Bulletin No. 14, Dealer Bulletin No. 6), follow the instructions carefully. Particular care should be given to the following operations:

(1) Remove all traces of oil from all parts of the valves and valve housing and rub flake graphite into the surfaces of the pistons and cylinders. Use only dry flake graphite and blow off all excess.

(2) After assembling the solenoids and lower plate to the valve housing, put the valves in place and see that they do not bind. Binding may be caused by drawing the lower plate screws unevenly or improper installation of the cork gasket.

(3) Be sure the 2460-A Dolphinite forms a complete seal around each solenoid and fill the opening in the solenoid cup through which the wires pass.

(4) When assembling the filter hose and elbow, carry the hose directly under the solenoids. If it is carried to right of the solenoids. If it is carried to the right of the solenoids, the metal elbow No. 48254 will strike the frame "X" member and cause a rattle.

(5) Be sure all dirt is blown out of the hose and tubing before installation.

(Continued on page 15)

Transmission Lubricant.

Don't overlook the necessity of replacing 3 ounces of the regular SAE-80 gear lubricant in the transmission with 3 ounces of kerosene in cars operated at zero temperature. See page 37 of the January issue of Terraplane Hudson Service.

Contact Plate Adjustment

The testing of the position of the contact plate is covered under (c) and the paragraphs following (h), page 32 of the January issue of Terraplane Hudson Service. The dowel pins on the contact plate have been removed in cars of later production and the location is made positive by drilling through the contact plate into the transmission control housing and dropping a dowel pin into the hole. This dowel is a precaution necessary only for handling in our Assembly Department.

When servicing cars it is not necessary to replace this dowel pin as the position can be held permanently by drawing down the four screws which hold the contact plate in position.

After removing a contact plate for servicing or when installing a new plate, test the position using the lower harness test set as covered on page 32 of the January issue, keeping in mind the changes that have been made in the method of doweling. **If the contact plate is not in proper position, the transmission will not come to true neutral and the cross shift cannot be made.**

Electric Hand Testing Equipment

The Factory Service Department has attempted to supply complete information and instructions for the servicing of the Electric Hand. Detailed information is contained in the December and January issues of this publication. Additional information is contained in this issue under the heading of Electric Hand Notes.

In order to make use of this information it is essential that the Electric Hand Test Kit No. 47898 be used. This kit has been so developed that it makes testing of the Electric Hand a simple routine matter. No Terraplane Hudson Service Station can afford to be without this Test Kit particularly since it is being supplied at absolute cost. If you do not already have a kit place your order with your distributor immediately.