# DESCRIPTION, INSTALLATION, ADJUSTMENTS AND PARTS ORDERING INFORMATION OF THE 122391** SET OF PARTS TO EQUIP A SIGNAL DISTORTION TEST SET (BELL SYSTEM 1A TELETYPEWRITER TEST SET) FOR THE TRANSMISSION OF ALTERNATE R AND Y SIGNALS

## 1. DESCRIPTION

*a. The 122391** set of parts provides an additional mechanism for the transmission of alternate R and Y signals from a signal distortion test set for the purpose of orienting and testing Teletype equipment such as the sequential selector. These R-Y signals may be transmitted, either undistorted or distorted, under the influence of controls on the front panels of the test set.

*b. The 122391** set of parts consists of:

| | | |
|---|---|---|
| 2 | 2669 | Washer, Lock |
| 2 | 85471 | Screw |
| 1 | 122388 | Cam |
| 1 | 128341** | Switch and Relay Assembly which consists of: |

| | | |
|---|---|---|
| 2 | 1164 | Screw |
| 1 | 8262 | Knob, Switch |
| 4 | 109889 | Screw |
| 1 | 112924 | Relay |
| 1 | 122386 | Switch, Lever |
| 1 | 122387 | Plate, R-Y |
| 1 | 122389 | Bracket Assembly, Contact |
| 1 | 122392 | Cover, Relay |
| 1 | 122393** | Panel, Right |
| 1 | 122394 | Plate, Instruction |
| 1 | 122395 | Cable Assembly |

*c. The double asterik (**) represents a two-letter suffix which designates the paint finish. The following four standard wrinkle finishes are now available:

| | |
|---|---|
| AA - Black | AC - Light-Brown |
| AB - Gray-Green | AD - Dark-Brown |

Corresponding designations apply to the finished components of the 122391** set of parts.

d. For part numbers referred to in the following text but not included in the above list, refer to the Teletype Signal Distortion Test Set Parts Bulletin.

e. A relay contact operating cam is located on the intermediate gear shaft which rotates at one-half the speed of the distributor brush arm. The contour of the cam is such that for one half of a revolution of the intermediate gear shaft the contact is permitted to close and operate the relay. For the other half of a revolution the contact is held open and permits the relay to remain unoperated. The relay is wired for the transmission of the R signal when in its unoperated condition and for the transmission of Y when operated.

f. In order to transmit alternate R-Y signals the code selecting knob must be in the BLANK position, and the R-Y key switch must be in the operated position. Under these conditions, the transmitting contacts of the test set do not close. However, the relay contacts are wired to the transmitting contact terminals and the relay in conjunction with the R-Y key switch is substituted for the transmitting contacts.

2. INSTALLATION

a. Remove the nut and lock washer from the upper end of the intermediate gear shaft and mount the 122388 cam on the shaft. Replace the lock washer and nut.

b. Remove the motor pinion. Remove the 74805 intermediate gear shaft bracket mounting screw.

c. With the 112924 relay in position on the 122389 contact bracket assembly, mount the bracket assembly by means of two 85471 screws to the distributor shaft rear bearing bracket. These screws also secure the intermediate shaft bracket. Replace the motor pinion.

d. Remove and discard the right front plate with associated name plate after removing the control knobs and mounting screws. Retain the knobs and mounting screws.

e. Mount the 122394 plate, and 122393** panel with 112386 key switch by means of the mounting screws previously removed and replace the control knobs. (Figure 7)

f. Remove the contact assembly of the signal distortion test set and solder wires of 122395 cable to the contact terminals in accordance with wiring diagram 2663WD. Replace the contact assembly. Connect D.C. terminals of cable to test set in accordance with wiring diagram.

NOTE: The transmitting contacts are numbered, starting at top of diagram, 0, 1, 2, 3, 4, and 5.

3. ADJUSTMENTS

For standard Signal Distortion Test Set adjustment refer to Teletype Signal Distortion Test Set Adjustment Bulletin.

a. CAM PULSING CONTACT ASSEMBLY ADJUSTMENTS

(1) Contact Alignment (Figure 1) The cam follower must ride centrally on the cam and the contact points must be in alignment. To adjust, loosen screws and shift contact assembly.

266.36
243.00
23.36



(2) Contact Clearance (Figure 1) With the cam follower on the high part of its cam, there should be .010" to .020" clearance between the contacts. To adjust, bend lower spring.

(3) Contact Tension (Figure 2) With the cam follower on the low part of its cam, it should require between 3-1/2 and 4-1/2 ozs. to just separate contacts. Contact surfaces must meet squarely when closing. To adjust, bend springs. Recheck contact clearance (Figure 1).

(4) Cam Follower Clearance (Figure 2) There must be some clearance between the cam follower and the contact spring extension when the cam follower is in the indent of the cam. To adjust, refine and recheck the contact adjustments (sub. pars. (1), (2) and (3) above).

b. CAM POSITION ADJUSTMENT

NOTE: The following adjustment combines the code disc phasing adjustment with the cam positioning adjustment.

With the code selecting knob in the TEST MESSAGE position, rotate the brush shaft until the number 3 outer contacts close. The brush for the outer ring of the fixed disc should be not more than 3/4 of a segment length in either direction from the gap between the stop and start segments. The relay contact operating cam should be positioned so that the score mark is directly opposite the cam follower.

To adjust, loosen the nut on the upper end of the intermediate gear shaft. Rotate the code discs until the number 3 outer contacts just close and hold the discs from moving. Rotate the brush shaft until the brush for the outer ring of the fixed disc is at the gap between the stop and the start segments. Position the relay contact operating cam so that the score mark on the top of the cam is in line with the contact cam follower. Tighten the nut on the intermediate gear shaft.

c. RELAY ASSEMBLY ADJUSTMENT AND OPERATING REQUIREMENTS

(1) Assembly Requirements

Requirements (a) through (h) are attained in the assembly of the relay and need be checked only if the relay has been dismantled to replace worn or damaged parts. The relay may be adjusted to meet these requirements by loosening the screws and positioning the various components and/or bending associated springs as required.

(a) There should be at least .008" clearance between the armature and the adjusting stud in all positions of the armature travel. Gauge by eye. In questionable cases use an .008" feeler gauge. (Figure 5)

(b) The outer edges of the contact springs should be aligned within 1/32". Gauge by eye.

(c) The contact springs should be aligned so that the width of the contacting surface of one contact bar falls wholly within the length of its mating contact bar. Gauge by eye. (Figure 3)

(d) The edges of all contact springs should clear the edges of the spool head by at least .010". Gauge by eye or use .010" feeler gauge.

(e) The spring studs should not rub or touch the sides of the holes through which they pass during operation of the relay. (Figure 4)

(f) Spring tangs should rest on the spool head as shown in Figure 4. Gauge by eye.

(g) The armature should be centered with the relay core, and the legs of the armature must clear the spool head (Figure 5) at all times. Gauge by eye.

(h) Both legs of the armature should bear against the hinge bracket with the relay energized and continue to bear against it when released. Gauge by eye. Operate relay electrically.

NOTE: When relay measurements are called for in the operated or energized condition, apply 120 volts D.C. to the relay coil.

(2) Relay Adjustment Requirements

The following requirements, sub-paragraphs (2) through (3) inclusive, should be checked periodically and after any repairs or replacements have been made on the relay.

(a) Adjust the backstop nut so that, with the relay unoperated a .050" gauge will go between the armature and core and a .056" gauge will not go.

Use gauges (from the 114197 set of gauges) inserted as shown (Figure 5).

(b) All springs should be free from sharp kinks or bends. A gradual bow is permissible. Gauge by eye.

(c) There should be at least .008" clearance between adjacent springs in both operated and unoperated positions. Gauge by eye or use an .008" gauge if available.

(d) Contact Spring Tensions

1. All springs should be tensioned toward the armature. The springs indicated (refer to Figure 6) should be measured with the armature operated.

2. All other springs should be measured with the armature unoperated.

3. All springs should be measured with the scale applied to a point between the contacts and the end of the spring.

4. The tension of a bifurcated spring (Figure 4) should be measured by engaging both legs of the spring at the same time.

5. The tension of any spring should be measured by lifting it slightly off its resting place so that there is a perceptible space between the spring and its resting place.

6. The tensions should be adjusted by bending the contact springs with spring adjustors 114199, 114200, 114202 or 102438.

7. Springs designated A (Figure 6) need have no definite tension but should be tensioned toward the armature and should hold the armature against the adjusting nut with a pressure of at least 18 grams. Measure by applying the end of a 114198 gram scale to the back of the armature just below the adjusting nut, in line with the tops of the contact springs.

NOTE: The loads of the two banks of contacts on each relay should be distributed so that the difference in load between the two is not greater than 2-1/2 times. To measure apply the gram scale to each A spring nearest the armature at the stud, and in a direction to move the spring away from the armature (Figure 6).

8. Each spring designated B should have a tension of at least 18 grams against its associated C spring (Figure 6).

9. Each spring designated C should have a tension of at least 25 grams against the spool head notches (Figures 4 and 6).

(e) Armature Alignment

1. With the relay energized as indicated in Sub. Par. 3c.(1)(h), at least one stop button on the armature should rest against the core. The other button should not clear the core by more than .005". Gauge visually and if in doubt with a .005" gauge.

2. To make the above adjustment, bend the leg of the armature hinge bracket associated with the side that does not touch the core.

(f) Stud Gap

1. With the armature unoperated, the clearance at points S shown (Figure 6) should be from .002" to .004".

2. With the armature unoperated, the clearance at points T should be at least .006" (Figure 6).

3. To meet these requirements, bend the tangs of the C springs involved (Figures 4 and 6).

NOTE: It may be necessary to readjust the tensions of the C springs and their associated A or B springs to meet these above stud gap requirements (sub-paragraphs (f), 1 through 3 inclusive).

(g) Relay Contact Gap Requirements

1. There should be at least .005" clearance between each pair of contacts normally open with the relay unoperated (Figure 6).

2. Insert an .018" gauge as shown (Figure 5) and electrically energize (operate) the relay as described in Paragraph c. (1) (h). Contacts which are normally open with the relay unoperated should remain open.

3. With an .008" gauge inserted as above, at least one of the two normally open contacts on each spring should close (Figure 4).

4. With the relay energized without a gauge between the armature and core, all normally closed contacts should have a gap of at least .005" (Figure 6).

5. With the relay energized as in Paragraph 4. above, all normally open contacts should close.

6. To meet these requirements, bend the tangs of the "C" spring. The stud gaps and spring tensions associated with any readjusted C spring must be rechecked and readjusted if disturbed (from Paragraph 3 c. to Paragraph 4).

(3) Relay Operating Requirements

(a) Energize the relay as described in Sub. Par. 3c. (1) (h) and make certain that the armature pulls up firmly against the core without apparent lag or hesitation.

NOTE: If the relay does not meet this requirement decrease the tensions on the A and B springs within their specified limits.

(b) With the relay energized, determine that good contact is established between the light and heavy contact springs. To make this test apply the end of the 94646 orange stick to the heavy spring and move it away from the light spring. The light spring should follow the heavy spring for a short distance before the contacts open.

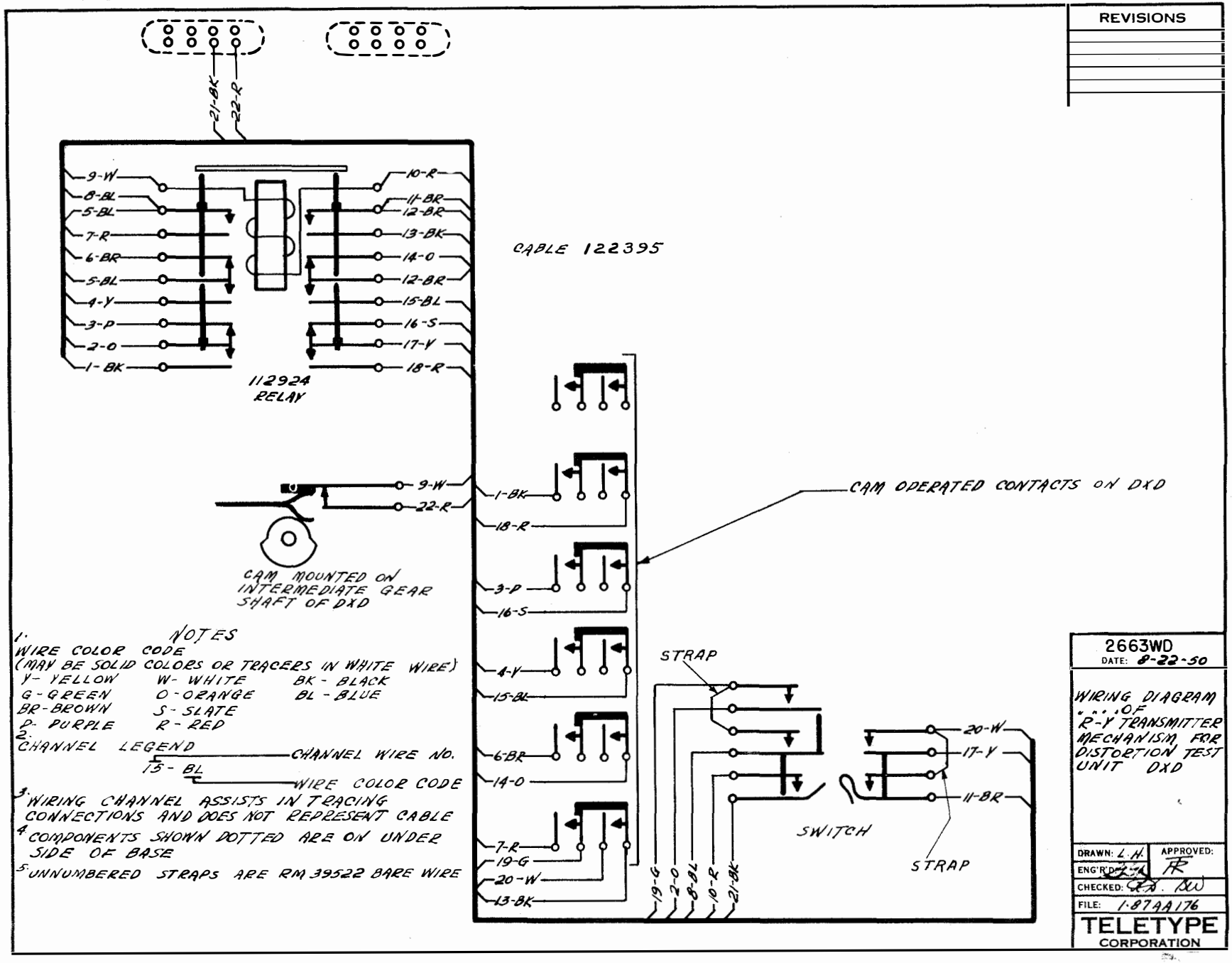
(c) With the relay unoperated, apply the test in (b) above to the contacts that are normally closed.

## 4. TEST SET OPERATION

The testing procedures when using alternating R and Y signals are similar to those that are followed when using other characters transmitted by the Signal Distortion Test Set.

## 5. LUBRICATION

Lubricate cam follower with one drop of oil at spring hinge and grease at point of contact with cam.


REVISIONS
21-BK
22-R
9-W
8-BL
5-BL
7-R
6-BR
5-BL
4-Y
3-P
2-O
1-BK
10-R
11-BR
12-BR
13-BK
14-O
12-BR
15-BL
16-S
17-Y
18-R
112924 RELAY
CABLE 122395
9-W
22-R
CAM MOUNTED ON INTERMEDIATE GEAR SHAFT OF DXD
CAM OPERATED CONTACTS ON DXD
1-BK
18-R
3-P
16-S
4-Y
15-BL
6-BR
14-O
7-R
19-G
20-W
13-BK
STRAP
19-G
2-O
8-BL
10-R
21-BK
20-W
17-Y
11-BR
SWITCH
STRAP
NOTES
1. WIRE COLOR CODE (MAY BE SOLID COLORS OR TRACERS IN WHITE WIRE)
Y - YELLOW
W - WHITE
BK - BLACK
G - GREEN
O - ORANGE
BL - BLUE
BR - BROWN
S - SLATE
P - PURPLE
R - RED
2. CHANNEL LEGEND
CHANNEL WIRE NO.
15 - BL
WIRE COLOR CODE
3. WIRING CHANNEL ASSISTS IN TRACING CONNECTIONS AND DOES NOT REPRESENT CABLE
4. COMPONENTS SHOWN DOTTED ARE ON UNDER SIDE OF BASE
5. UNNUMBERED STRAPS ARE RM 39522 BARE WIRE
2663WD
DATE: 8-22-50
WIRING DIAGRAM OF R-Y TRANSMITTER MECHANISM FOR DISTORTION TEST UNIT DXD
DRAWN: L.H.
APPROVED:
ENG'RD:
CHECKED:
FILE: 1-87AA176
TELETYPE CORPORATION

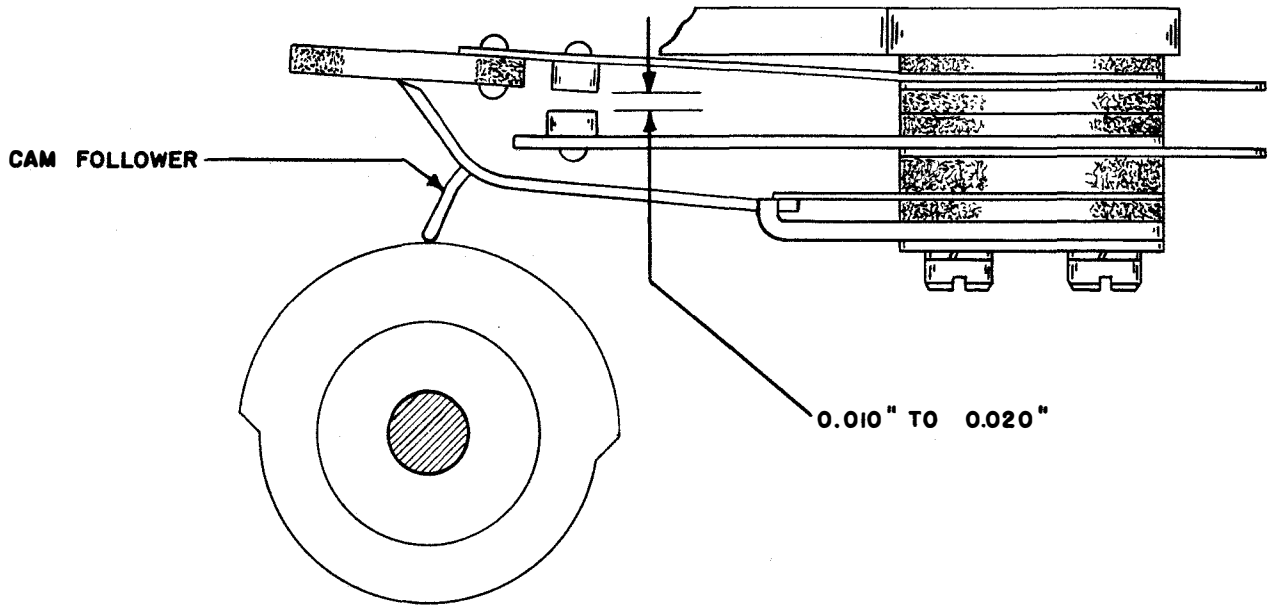



FIGURE 1

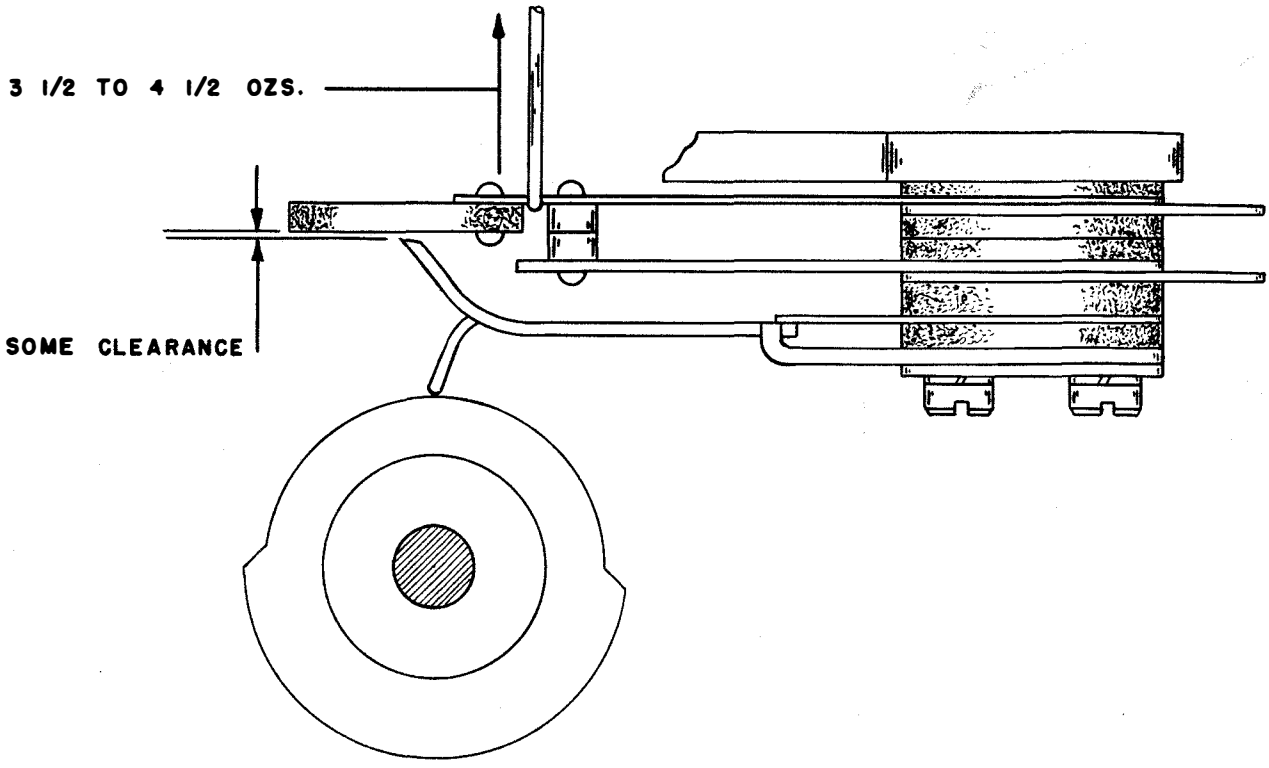



FIGURE 2

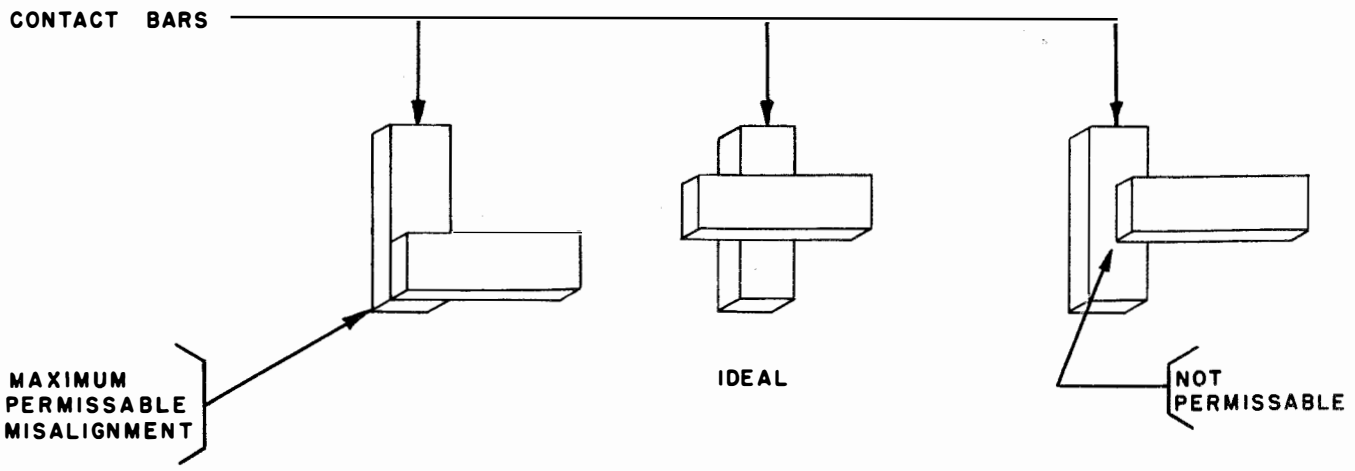



FIGURE 3

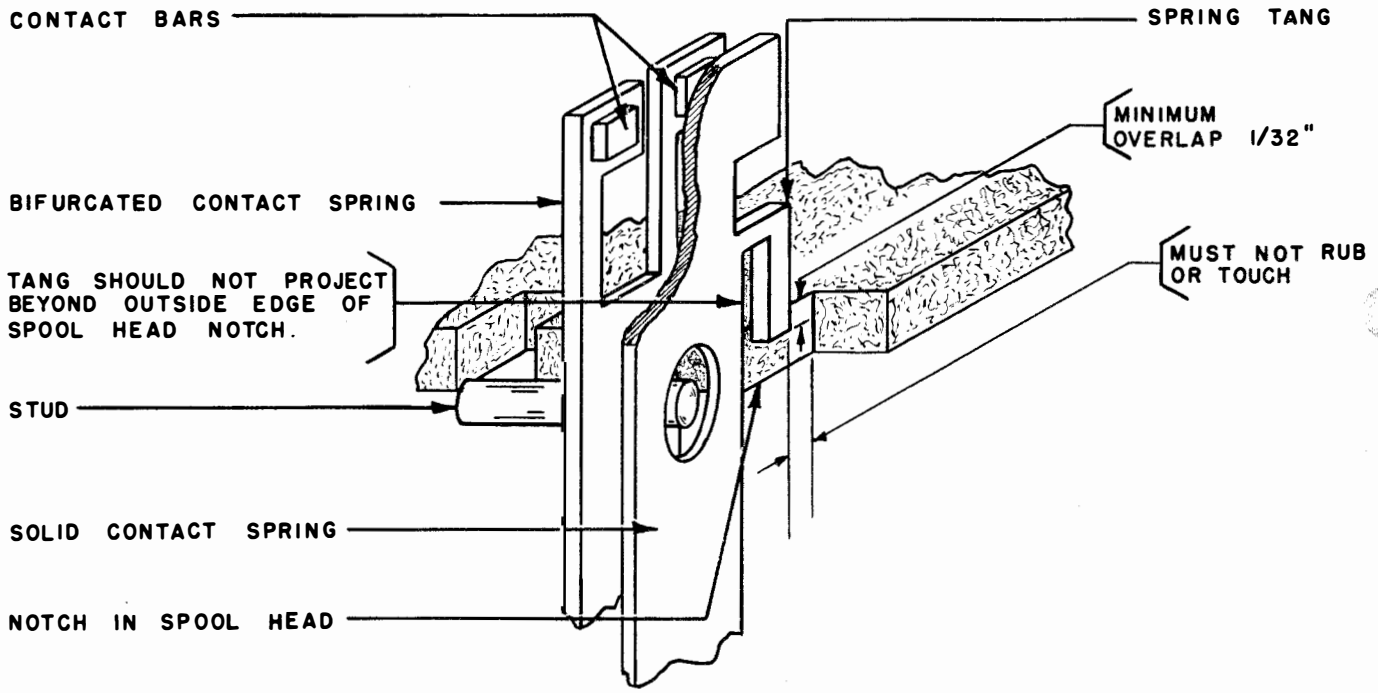



FIGURE 4

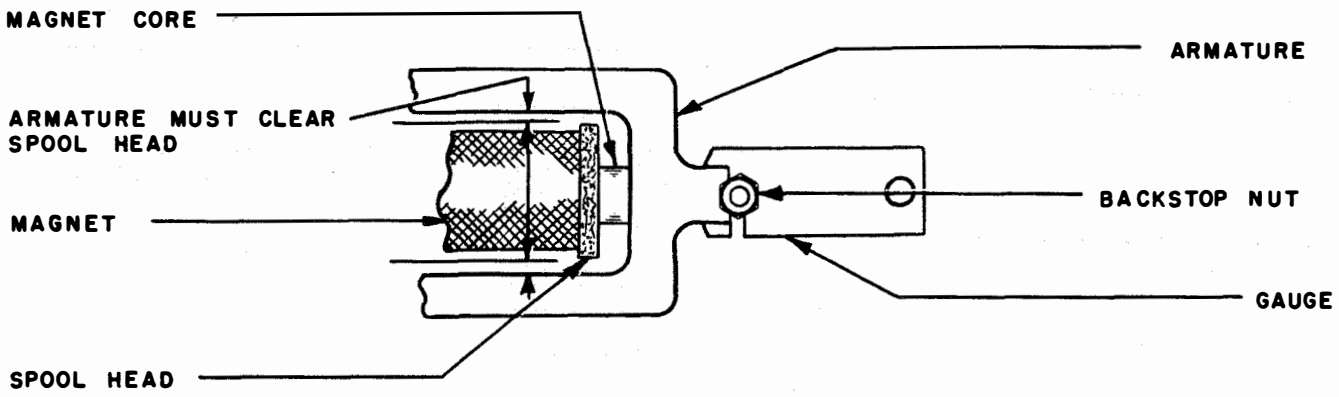



FIGURE 5

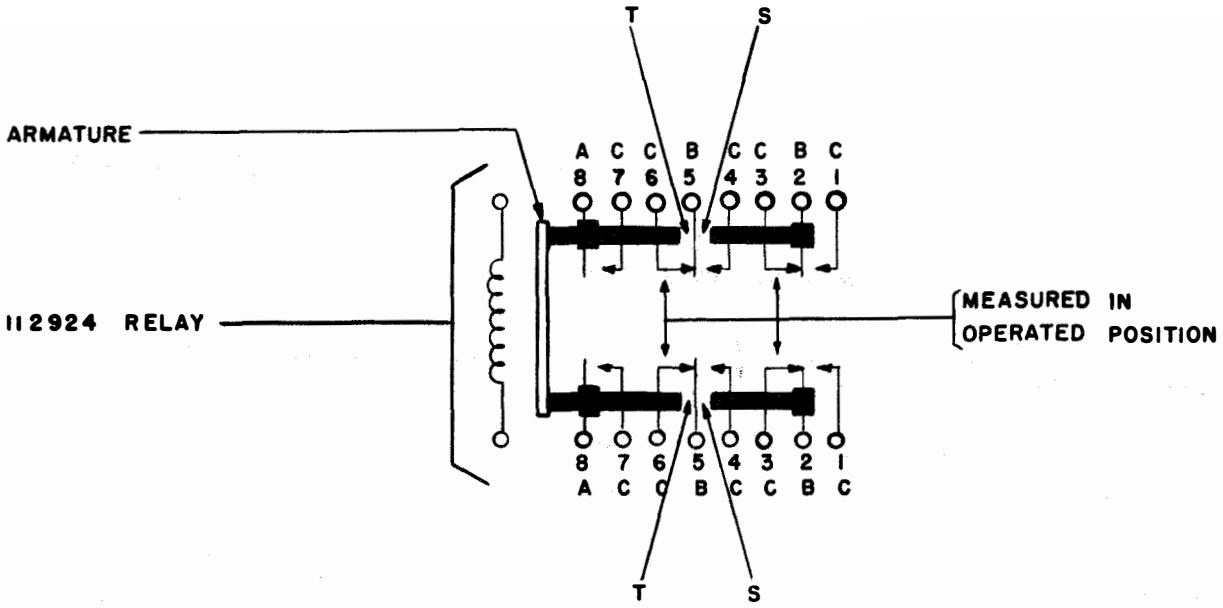



FIGURE 6

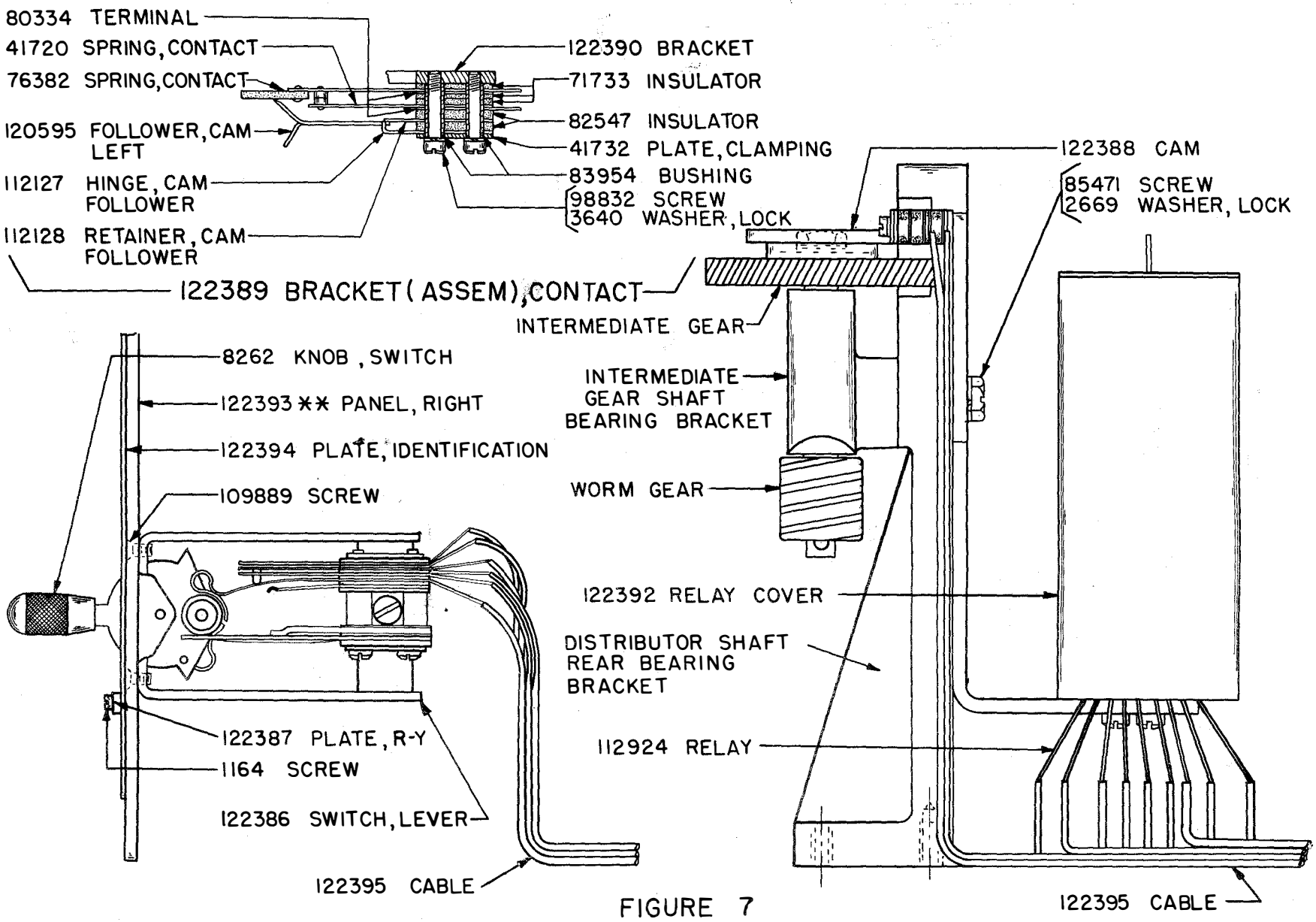

80334 TERMINAL
41720 SPRING, CONTACT
76382 SPRING, CONTACT
120595 FOLLOWER, CAM LEFT
112127 HINGE, CAM FOLLOWER
112128 RETAINER, CAM FOLLOWER
122389 BRACKET (ASSEM), CONTACT
122390 BRACKET
71733 INSULATOR
82547 INSULATOR
41732 PLATE, CLAMPING
83954 BUSHING
98832 SCREW
3640 WASHER, LOCK
122388 CAM
85471 SCREW
2669 WASHER, LOCK
INTERMEDIATE GEAR
INTERMEDIATE GEAR SHAFT BEARING BRACKET
WORM GEAR
8262 KNOB, SWITCH
122393 ** PANEL, RIGHT
122394 PLATE, IDENTIFICATION
109889 SCREW
122392 RELAY COVER
DISTRIBUTOR SHAFT REAR BEARING BRACKET
112924 RELAY
122387 PLATE, R-Y
1164 SCREW
122386 SWITCH, LEVER
122395 CABLE
122395 CABLE

FIGURE 7