

14-TYPE LINE MESSAGE REGISTERS REQUIREMENTS

1. GENERAL

1.01 This section covers the requirements for the 14-type line message registers.

1.02 This section is reissued to:

- Redefine "Improved Design" as "MOD 1" and add "MOD 2"
- Add codes 14AD and AE
- Add two new figures, one showing operating pawl of the MOD 2 register and one an overall view of a typical MOD 2 register
- Add 2.001, List of Tools, Gauges, and Materials
- Make other changes as required.

Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 *Asterisk (*)*: Requirements are marked with an asterisk when to check for them would necessitate dismantling or dismounting of apparatus or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons, or its performance indicates that such a check is advisable.

1.05 The 14-type register consists of three configurations. For the purposes of this section, they will be identified as "14-type initial design," "14-type MOD 1" (identified in previous issues as improved design), and "14-type MOD 2."

The basic description and function of the three configurations are as follows.

- (a) The 14-type initial design has a 2-piece flexible pawl which advances the units disc one full step as the register releases (magnet de-energizes).
- (b) The 14-type MOD 1 has a one-piece rigid pawl which advances the units disc one-half step when the register operates and the remaining half step when it releases.
- (c) The 14-type MOD 2 has a new one-piece frame, a new one-piece pawl, and a new armature assembly. The pawl is driven by the armature but is a separate part from it. The units wheel advances one-half step when the register operates and the remaining half step when it releases.

1.06 *Operate*: A register is said to operate if, when current is applied to its winding, the armature moves toward the core until stopped by the operating pawl and normally open contacts close or normally closed contacts open if contacts are provided. The units disc on the MOD 1 and MOD 2 configurations shall advance one-half digit.

1.07 *Nonoperate*: When the nonoperate current is applied, the armature shall not move from its unoperated position.

1.08 *Release*: A register is said to release when the current is reduced from the operate or hold value to the release value and the armature moves away from the core until stopped by the operating pawl. The normally open contacts will open, and the normally closed contacts will close if contacts are provided. The units disc will advance one digit on the initial design model and one-half digit on the MOD 1 and MOD 2.

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SECTION 030-331-701

1.09 Hold: When the operate current is reduced abruptly to the hold value, the armature shall not move from its operated position.

1.10 To gain access to various parts of the register when checking requirements, it may be necessary to move the register mounting plate forward or to remove the register from the mounting. It also may be necessary to use the 90B cap remover tool.

1.11 This section contains no adjusting procedures for these registers. Requirements 2.01 through 2.15 specified herein apply only up to and including turnover to the telephone company.

Caution: *Do not adjust line message registers. If a line message register does not meet requirements, with the exception of register mounting and alignment, replace the register. Only the message register mounting and alignment may be adjusted.*

1.12 The after turnover 100 operation test covered in 2.16 shall be applied in accordance with the section covering the line message register for the specific type of office involved.

2. REQUIREMENTS

2.001 List of Tools, Gauges, and Materials

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
90B	Cap remover
KS-6320	Orange sticks
KS-8511	Tweezers
GAUGES	
70F	10-0-10 gram gauge
70J	0-150 gram gauge
92T	0.005-inch nonmagnetic thickness gauge
MATERIALS	
—	Toothpicks, hardwood, flat at one end and round at the other

2.01 Alignment of Number Wheels: Fig. 1, (A)—With the register in the unoperated position, after having been electrically operated and released, the following requirements shall be met.

- (a) The top of any figure on a number wheel shall not lie above the top edge of the window.
- (b) The bottom of any figure on a number wheel shall not lie below the bottom edge of the window.

These requirements are considered met if a satisfactory check is obtained after each of ten consecutive operations of the register.

Gauge by eye through the window.

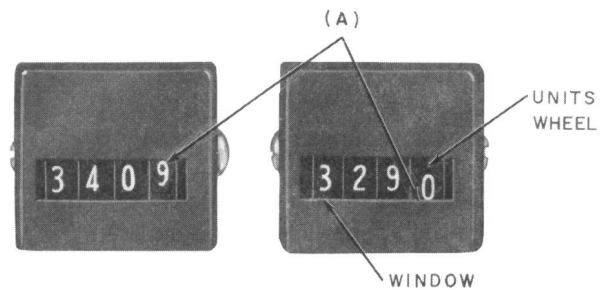


Fig. 1—Alignment of Number Wheels

2.02 Operating Pawl Position

MOD 1 and MOD 2

- (a) **Figures 2 and 3:** The top and bottom teeth of the operating pawl shall drop between each pair of star wheel teeth as the register is operated and released ten times.

Gauge by eye.

To check this requirement, electrically operate and release the register. Observe on operation and release that the pawl comes to rest on the

surface between the star wheel teeth and also that the units wheel has advanced one-half step on operate and a full step on operate plus release.

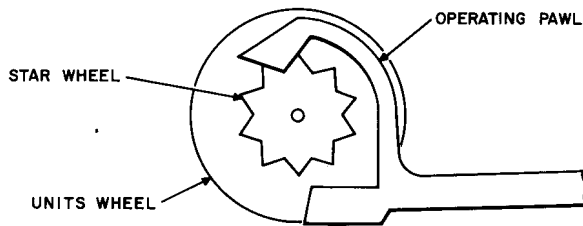


Fig. 2—Operating Pawl In Unoperated Position (MOD 1)

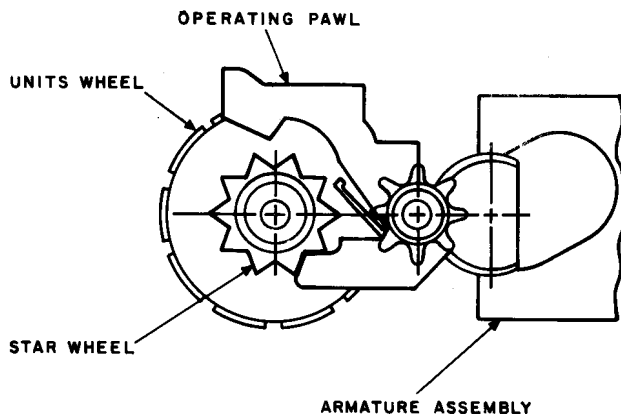


Fig. 3—Operating Pawl in Unoperated Position (MOD 2)

(b) **Figure 4:** With the register in the nonoperate position, the operating pawl shall not project over the side of the star wheel more than 0.015 inch when the endplay in the number discs is taken up to the left and the endplay in the armature is taken up to the right as viewed from the front.

Initial Design

(a) **Figure 5, (A):** The operating pawl shall drop behind each ratchet tooth as the register is operated and released ten times.

Gauge by eye.

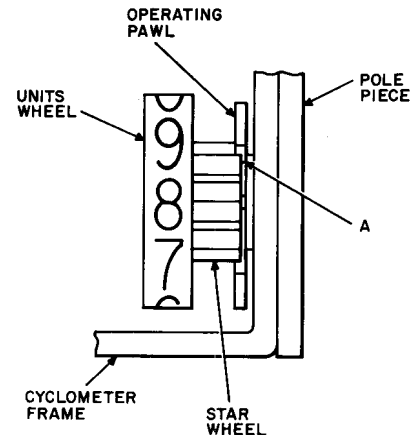


Fig. 4—Alignment of Operating Pawl (MOD 1 and MOD 2)

To check this requirement, electrically operate and release the register. Observe on release that the pawl comes to rest on the surface between the ratchet teeth and also that the units wheel has advanced one step.

Note: The pawl may, but need not, rest at the corner of the tooth as shown at (A) in Fig. 5.

(b) **Figure 6, (A):** With the register in the unoperated position and with the play in the number wheels taken up to the left, not more than 1/4 the width of the operating pawl shall extend beyond the right-hand edge of the ratchet teeth. This requirement shall be met on all teeth of the ratchet wheel.

Gauge by eye.

2.03 Backstop Pawl Position (Initial Design Only): Fig. 5, (B)—The backstop pawl shall drop freely between two ratchet teeth after operation and release of the register.

Gauge by eye.

To check this requirement, insert one end of a toothpick above the cyclometer frame crosspiece between the operating pawl and the coil spring. Push the armature toward the core as far as possible. Quickly remove the toothpick, and observe that the units wheel has advanced one step. Reinsert the toothpick, and slowly push the armature toward

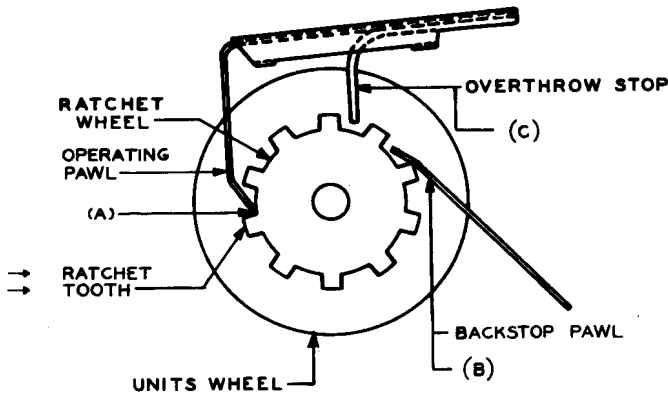


Fig. 5—Backstop Pawl, Operating Pawl, and Overthrow Stop in Unoperated Position of Register (Initial Design)

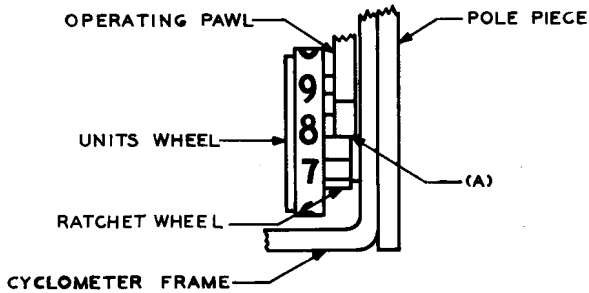


Fig. 6—Alignment of Operating Pawl (Initial Design)

the core. Observe that there is a backward movement of the units wheel.

2.04 Overthrown Stop Position: Fig. 5, (C)—The overthrow stop shall drop into its position between two ratchet teeth after operation and release of the register and prevent free forward rotation of the units wheel.

Gauge by eye.

To check this requirement, manually attempt to rotate the units wheel in a forward direction after operation and release of the register. Note that it cannot be advanced to the next position.

Check at each ratchet tooth.

***2.05 Freedom of Operation**

(a) The armature shall not bind on its bearings.

Gauge by feel.

(b) The operating pawl shall not touch the cyclometer frame or the side or top of the units wheel either in the operated or unoperated position of the register. This requirement shall be met on every ratchet tooth.

Gauge by eye.

(c) **Figure 7, (A):** The ends of the distance rod shall not bind against the sides of the pole piece.

Gauge by eye and feel.

To check this requirement, hold the armature free of the distance rod with the KS-6320 orange stick. Grasp the center portion of the distance rod with the KS-8511 tweezers, and observe whether the distance rod moves freely from side to side and toward and away from the core.

2.06 Number Wheel Endplay: There shall be at least 0.004-inch endplay between the number wheels and the frame.

Gauge by eye and feel.

2.07 Register Mounting and Alignment: Fig. 13, (A)—Registers shall be mounted approximately level and shall be fastened securely to the mounting plate.

Gauge by eye and feel.

To check this requirement, apply light pressure to the register in the horizontal and vertical directions. Do not attempt to turn the register.

2.08 Register Cover Assembly Fit: Fig. 13, (B)—The register cover assembly shall be held firmly in position on the register but shall be removable with the 90B cap remover.

Gauge by feel.

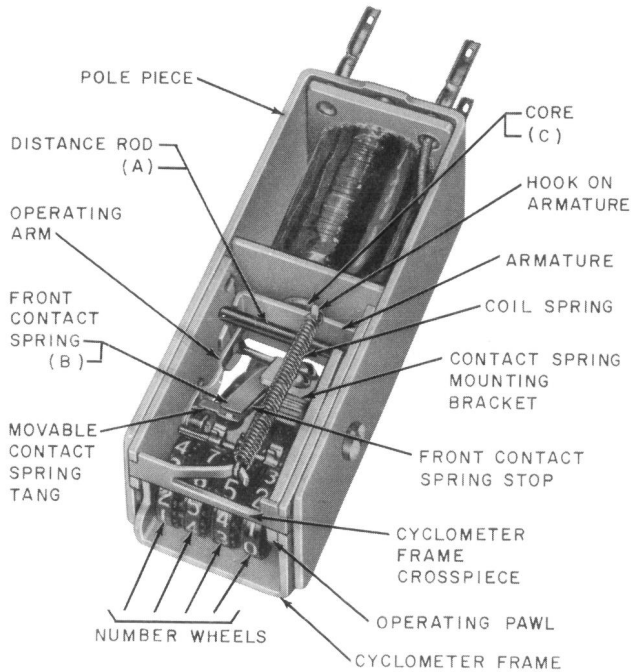


Fig. 7—14-Type Register Having Normally Open Contacts

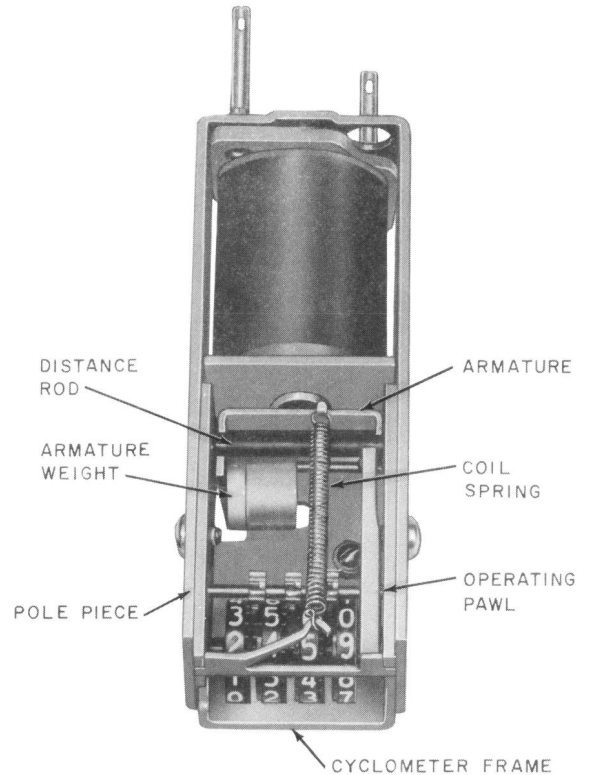


Fig. 9—14D Message Register

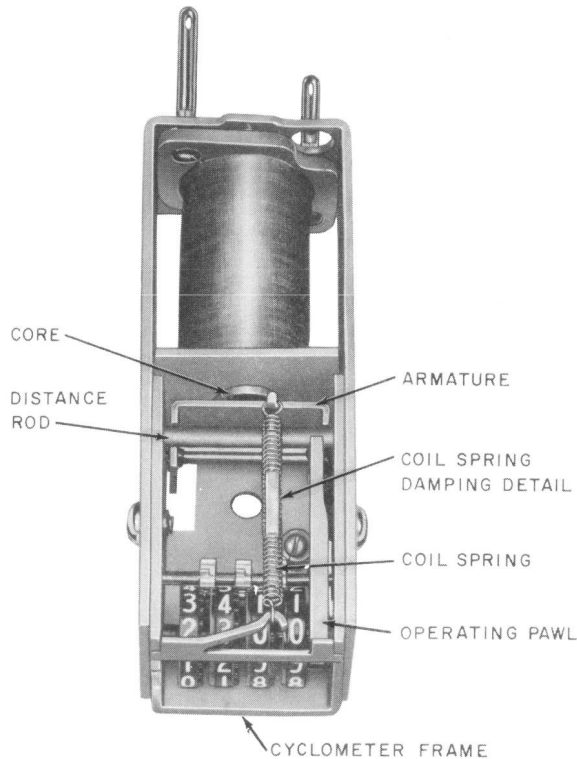


Fig. 8—14C Message Register

2.09 Contact Make (Registers Having Normally Open or Normally Closed Contacts): The contacts shall operate while the tip of the operating pawl is on the top of the ratchet tooth (*initial design only*). When the armature is fully operated, the normally open or normally closed contacts shall close or open, respectively (*MOD 1 and MOD 2*).

Gauge by eye.

To check this requirement, insert one end of a toothpick above the cyclometer frame crosspiece between the operating pawl and the coil spring. While pushing the armature with the toothpick, brace the hand against adjacent registers in order to accurately control armature movement. Stop moving the armature when the contacts just make or just break, and note the position of the operating pawl with respect to a ratchet tooth.

***2.10 Tension of Front Contact Spring** (Registers Having Normally Open Contacts): Fig. 7, (B)—With the armature in the unoperated position, the tension of the front contact against its stop shall be

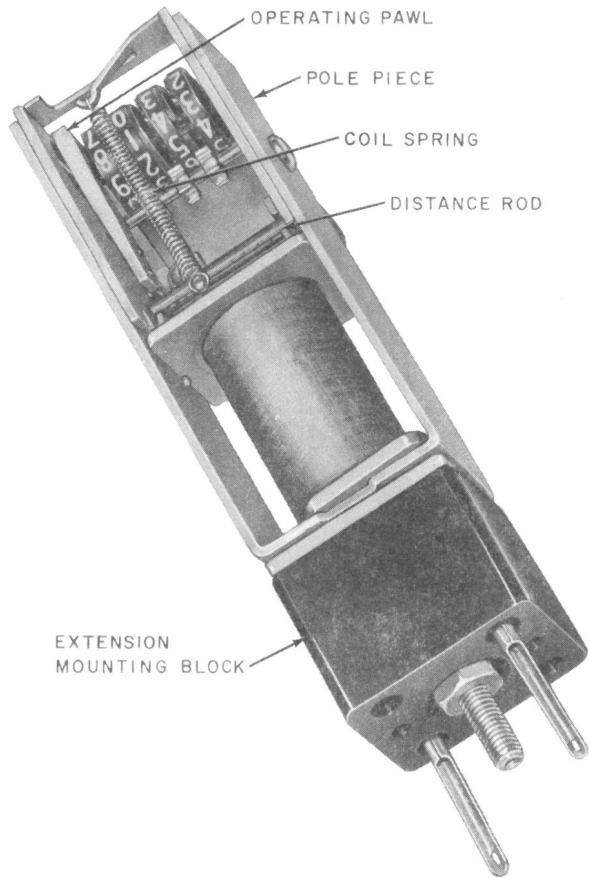


Fig. 10—14-Type Message Register for Mounting in Place of 5- and 12-Type Registers (14LA Register Shown)

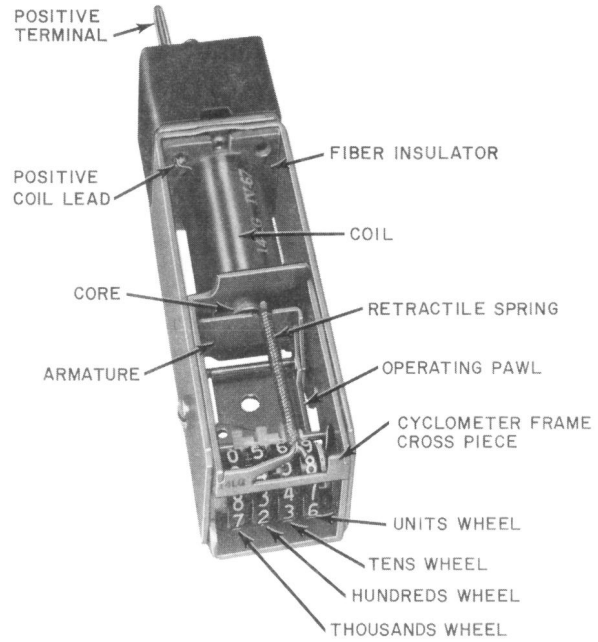


Fig. 11—14-Type Register With Cover Removed (MOD 1, 14LG Register Shown)

Min 8 grams

Use the 70F gauge applied between the end of the front contact spring and its contact.

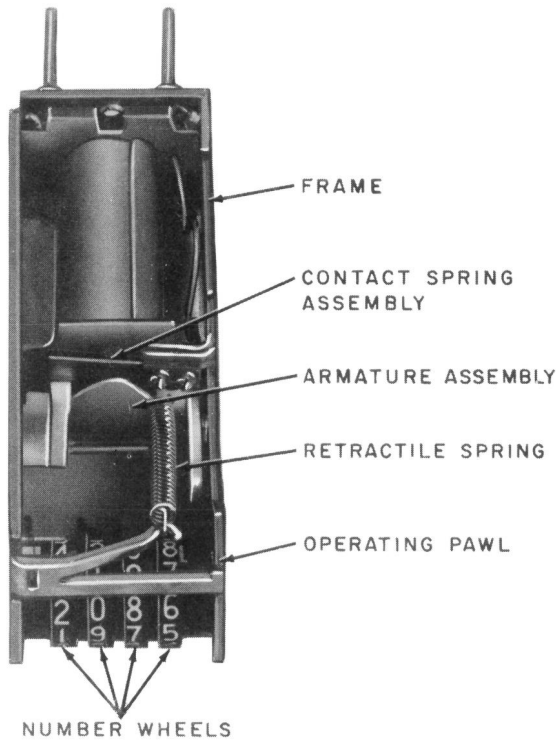


Fig. 12—14-Type Register With Cover Removed (MOD 2)

2.11 Contact Separation

(a) **Normally Open Contacts:** With the armature in the unoperated position, the separation between contacts shall be

Max 0.010 inch
Min 0.005 inch

Gauge by eye.

The thickness of the front contact spring is 0.010 inch. To check this requirement, raise the outer end of the movable contact spring with a toothpick until the contacts close. Check that the outer end of the spring moves at least 0.010 inch.

***2.12 Coil Spring Tension:** With the armature in the operated position, the tension of the coil spring shall be as follows:

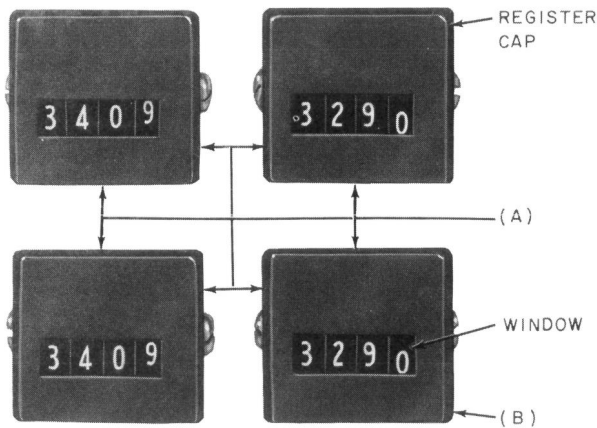


Fig. 13—Register Mounting and Alignment

MESSAGE REGISTER	ARMATURE COIL SPRING TENSION - GRAMS					
	INITIAL DESIGN		MOD 1		MOD 2	
	MAX	MIN	MAX	MIN	MAX	MIN
14B		65		65		40
14C		65		100		40
14D	75	55	75	45		40
14E				35		40
14F		65		70		40
14G				70		40
14H				70		40
14J				70		40
14K				70		40
14M				35		40
14P		65		70		40
14R		65		70		40
14S		65		70		40
14T	75	55	90	70		40
14U		55		70		40
14W		65		70		40
14AA		55		70		40
14AD				35		40
14AE						40
14LA		65		65		40
14LB		65		100		40
14LC	75	55	75	45		40
14LD				70		40
14LE				70		40
14LF				70		40
14LG		65		65		40
14LH		65		70		40
14LJ		55		70		40
14LK				35		40
14LL				70		40
14LM		55		40		40
14LN		65		65		40
14LP				70		40
14LR				70		40
14LS				70		40
14LT				70		40
14LU		65		70		40
14LW		65		70		40
14LY		65		70		40

Use the 70J gauge.

To check this requirement, apply the gauge to the hook on the armature to which the coil spring is attached. Move the armature to its operated position with the gauge. Then slowly release the tension,

and measure the coil spring tension just as the armature leaves its operated position. On registers equipped with contact springs, prevent the operating arm from engaging the contact spring tang while measuring coil spring tension. Do this by lifting the contact spring having the tang using the KS-6320

orange stick. To avoid affecting the spring adjustment, do not lift the spring more than necessary.

2.13 Coil Spring Lug Position

- (a) **Figure 14, (A)**—The front of the coil spring lug shall not extend further than the rear face of the cyclometer frame crosspiece nor backward further than 7/32 inch from the same face.

Gauge by eye.

- (b) **Figure 14, (B)**—The offset portion of the lug shall be approximately straight except at the outer portion to which the coil spring is attached.

Gauge by eye.

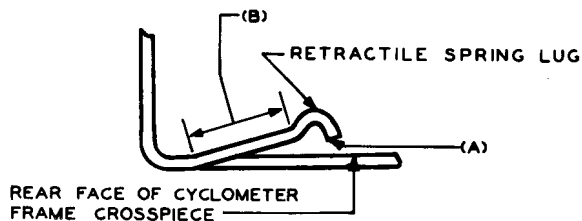


Fig. 14—Coil Spring Lug Position

*2.14 Operated Armature Gap: Fig. 7, (C)

- (a) **14S, 14W, and 14LW Registers:** With the armature electrically operated, there shall be an observable gap between the armature and the core at the closest point.

Gauge by eye.

- (b) **14LY Register:** With the register electrically operated, the armature shall touch the core and the distance rod shall have sufficient play to rotate freely.

Gauge by eye and feel.

Check this requirement as follows. Wind a small rubber band around one end of the KS-6320 orange stick. Electrically operate the register.

Using the rubber band on the orange stick, check for rotation of the distance rod.

- (c) **All Other Registers:** With the armature electrically operated, the gap between the armature and the core at the closest point shall be

Min 0.006 inch

Use the 92T gauge.

To check this requirement, electrically operate the register and insert the 92T (0.005 inch) gauge between the armature and core. The gauge should fit loosely.

2.15 Electrical Requirements

- (a) The register shall meet the electrical requirements specified on the circuit requirements table. The requirements shall be applied in the following order: Operate, Hold, Release, and Nonoperate. The nonoperate requirement shall be met as described in (b) and (c).

- (b) **14C, 14P, 14S, and 14LB Registers:** These registers shall meet the nonoperate requirement immediately after the release of the register.

- (c) **All Other Registers:** These registers shall meet the nonoperate requirement immediately after the release of the register. However, if any of the registers fail, the following additional test shall be made. The register shall be operated and the nonoperate requirement applied a minimum of 5 seconds after release. If the register meets this test, the requirement is considered met.

2.16 100 Operation Test

- (a) **Other Than No. 5 Crossbar Offices (Applies Before and After Turnover):** The register shall operate 100 consecutive times on the electrical operate value specified on the circuit requirements table applied with the interruptions furnished by the test provided for the office or an equivalent test set. This requirement shall be met with the register cover assembly in place.

Note: Where no test equipment is available for making the 100 operation test, it will be satisfactory to substitute for this test the

application of the electrical operate value a sufficient number of times to consecutively operate the register to cause three number wheels to turn. The number of applications shall not be less than ten.

(b) **No. 5 Crossbar Offices** (Applies Before Turnover Only): The register shall nonoperate 100 consecutive times on the nonoperate test condition and shall operate 100 consecutive times on the operate test condition. The nonoperate test condition shall be met before the operate test condition is applied. These test conditions shall be met with the register cover assembly in place.

Note: The test conditions shall be applied to the register in conjunction with the associated

tube and shall be at least as severe as those provided by the incoming trunk circuit SD-25834-01 for testing message registers or an equivalent test set. The message register power supply circuit provided in the office shall be used.

(c) **No. 5 Crossbar Offices** (Applies After Turnover Only): The register shall nonoperate 100 consecutive times on the nonoperate test condition and shall operate 100 consecutive times on the operate test condition furnished by the test circuit provided in the office. The nonoperate test condition shall be met before the operate test condition is applied. These test conditions shall be met with the register cover assembly in place.